

#1 Atari Computer Magazine

Win An Intra Disk Drive! See Page 6.

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Antic

The **ATARI** Resource

JANUARY 1985

VOLUME 3, NUMBER 2

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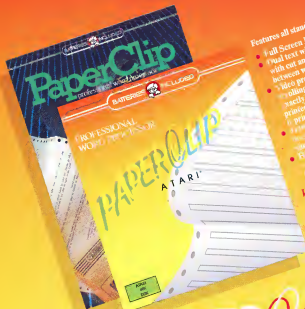
2 Type-In Games

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What will a compiler do for me?

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- support RUN "D:PROGRAM"?
- support ATARI string handling like A\$(2,4) = "BOD"?
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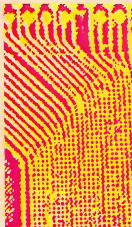
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Antic

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COLOR THE COVER

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can leave out all the cover text if you wish.

Of course, we recognize that it's hard to match the detailed quality of the cover's line art with your Atari. In fact, our publisher was the only one at **Antic** who thought it could be done.

So we are challenging you to use your creativity and come as close to reproducing the artwork as computer graphics technology allows.

You may work alone or collaborate with friends and family. Enter as many colorings as you want. But all entries must be received at **Antic** by February 1, 1985.

Be sure to send loading instructions along with your disk or cassette—plus a short note telling about yourself and your computer graphics tools.

The winning and runner-up microscreens will appear in the June, 1985 **Antic**. First prize is an Indus GT disk drive. Second and third prize are **Antic** T-shirts. All entries become the property of **Antic Publishing, Inc.** and will not be returned. Contest is void where prohibited.

Mail your entries to:
Color The Cover
Antic Magazine
524 Second St.
San Francisco, CA 94107.

As you probably noticed, this month's cover is missing something . . . color. We decided to leave the coloring to you, for once.

This is your invitation to enter **Antic's Color The Cover Contest** and possibly win an Indus GT disk drive list-priced at \$499.99. Send in a disk or cassette of your color rendition of the January **Antic** cover.

We're keeping the rules simple: You must use your Atari to reproduce the form and spirit of the cover drawing. Any Atari-compatible graphics hardware and software is eligible. You can reposition Super Utility Man to fit better across your video screen. And you

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microscreens

Outer space is the theme for two of this month's Antic microscreens. G. Manson of Sparks, Nevada presents a mysterious astronaut in "NASA".



San Franciscan Michael Green's ethereal "Moonview" was created using "Fun With Art" software.



We're not sure if our third microscreen, "Buddah" is supposed to be a scene from another planet or another dimension. Steven Dong, a medical school senior at the University of Texas, San Antonio, used up "valuable sleep time" to draw this with his Atari Touch Tablet.

If we publish your Atari computer art on our microscreens page, you get an Antic T-shirt. Send your pictures to Antic on disk or cassette with stamped self-addressed return envelope. Write loading instructions on a short note telling about yourself and which graphics tools you use . . . also include two choices of T-shirt size and color.



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THE BEAN MACHINE by Steve Robinson is an Award Winning Arcade game that will drive you crazy balancing a series of beams while trying to get all the beans to roll down, without touching, all the while avoiding 'strange creatures' who drop in to steal the beans. It's addictive!

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DIGGERBONK, another Award Winning game by Steve Robinson, challenges you to find your way through a continuously scrolling maze while avoiding some really strange creatures. Along the way you will need to Bonk some of them, but watch out for the bombs.

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LOTSABYTES

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i/o board

HELP US HELP YOU

I want to praise Antic for having the brains to publish "Brain Research with the Atari." I was sure an article like this would have been considered of too limited interest to have been published. Personally, I'd like to hear more about constructive uses of the Atari. I'm tired of games. Why can't your magazine offer a wider spectrum of articles?

Chuck Smithson
Reno, NV

We want to be of use to our readers. The only way we can be of use is to know what readers want to see and the best way to communicate this is to write us.

—ANTIC ED

CURING COLOR DISTORTION

I have a problem with my BMC color monitor: distortion is caused when I use the RF modulator and my Atari. Contrasting colors aren't sharp, but often bleed several pixels to the right or cast shadows. Even in BASIC, using the default colors, characters cast a shadow about one-third the character width, to the right.

I sent the computer to Atari and they said it was a problem with the 1200XL. When they were done, it was "fixed," several changes had been made in the computer, and the problem still exists. Calling back, I was told they did not know how to fix it. Can you help me?

Michael Ruthford
Houston, TX

We're passing this along to you, our readers. If anyone has a solution, or ideas, let us know. —ANTIC ED

I/O ODDITY

When I work in Immediate mode and I write

POKE 710,0: POKE 709,9:
LOAD "D:FILE.EXT"

I hear the loading program sound before the screen turns black. Why?

Ivan Antezana
Lima, Peru

Every 1/30th of a second, during the stage two vertical blank interval, certain registers in the operating system (OS) in

ROM look into related registers in RAM and steal the values for their own use. The RAM registers are called shadow registers to the ROM registers. In the case of your program line, 709 and 710 are shadow registers for locations 53271 and 53272. The program line is being processed so fast by BASIC that it begins execution of the file I/O before the OS registers can get the new color values from the shadow registers. During I/O, the Critical I/O Region Flag at location 66 is set, which suspends the vertical blank transfer process, and the ROM registers have to wait to get their new colors. If you add just the slightest delay after the two POKEs in your line, (such as PRINT CLOG(8)) the registers will have the time to transfer colors and your screen will change before the drive runs. —ANTIC ED

RIBBON RESURRECTION

A tip for Atari 1027 printer owners: If you've had the same trouble I've had finding replacement ink rollers, buy an inexpensive stamp pad ink (roller type) and ink the roller with it. This produces much clearer, better defined letters than even a new roller!

Gene Schoepp
Barneget, NJ

ACTION! HELP

OSS's Mike Pich was kind enough to pass along some information regarding Dave Plotkin's "Lights, Camera, ACTION!" article in the July 1984 issue. The SAVETEMPS and GETTEMPS routines described there are adequate only if the interrupt routine does not perform mathematical operations other than addition and subtraction. The following versions of those routines will work properly in more general cases. Compare the arrays in SAVETEMPS and GETTEMPS to the following:

```
SAVETEMPS="[$A2 $07 $B5 $C0 $48  
$B5 $A8 $48 $B5 $A0 $48 $B5 $80  
$48 $CA $10 $F2 $A5 $D3 $A8]"  
GETTEMPS="[$68 $85 $D3 $A2 $00  
$68 $95 $80 $68 $95 $A0 $68 $95  
$A8 $68 $95 $C0 $E8 $ED $08 $D0  
$F0]"
```

STAR RAIDERS

In response to Carol Waskowski's inquiry in the July I/O Board about others attaining Star Commander Class 1 in Star Raiders, I can proudly announce that I have obtained that level on many occasions. (Although Star Raiders remains one of the most popular Atari games, only a handful of readers indicated that they have achieved commander 1 status—ANTIC ED)

The difference between Star Commander 5 and 1 is one's efficient use of energy. Here are some tips to help you save energy and improve your score.

When entering an enemy-occupied quadrant, don't engage your engines. Let enemy ships come to you. Never chase enemies with damaged engines, for the energy you waste is more than the value of the enemy ship.

Attempt to destroy distant ships as soon as they are in sighting range, about 120 centrons. This requires pinpoint firing, but can be done with practice. This helps avoid the close combat that is so deadly at higher levels—hits on your shields cost 100 units each.

Always know where the nearest starbase is, and follow the advice in the third paragraph of survival tactics in the game booklet.

Turn off shields when you're not in combat. This saves energy. There is a chance of asteroid collision, but it is slim.

There are other tips, but this should help. The main idea is to conserve energy.

David Horne
Foster City, CA

WIPE OUT YOUR PROGRAM WITH ONE SIMPLE POKE

For those jaded Atari owners who are looking for just one more thing to do with their machines, we offer the following POKE 202,1. Place this poke in your favorite program and your program will be wiped from memory when it ends. Your program will also be wiped if you hit [BREAK] or [SYSTEM RESET]. In fact, anything which generates the READY prompt will result in erasure of the pro-

gram. Interesting possibilities for protection schemes, not Location 202 is the Load in Progress flag. When it has been set (by poking with a 1) the computer begins part of the load procedure immediately following the generation of the READY prompt. Among other things, the load procedure clears all program lines and variables from memory. —ANTIC ED

INVESTIGATING WITH ATARI

I am in the business of motor vehicle accident investigation and reconstruction. Are there any Atari programs available for purchase that deal with accident investigation, vehicle weights and measurements? Eldon Shannon, Huntsville, AL

We don't know of any, but if anyone does, we'll pass the information along.
—ANTIC ED

INTERFACING COMPUTERS

I own both an Atari and a TRS Model 100. I use the TRS extensively at work and on the road, and the Atari at home. I would like to transfer text and download files from the TRS to the Atari.

Denny Bowen
Crystal Lake, IL

Please see the "Electronic Notebook" article in the July, 1984 issue of Antic. It describes techniques for using the RS-232 connector (you'll need an 850 interface) and terminal software for both computers. This allows the machines to transfer data in ASCII. —ANTIC ED

THE EDGE OF LETTER PERFECT

When using Letter Perfect on my color TV I can't see the first letters on the left. This may be due to the kind of TV I'm using here in the Amazon jungle. Is there anything I can do about this?

Carlos Malaga
Ingalitos, Peru

The new Letter Perfect (version 6.0) has a Fix Window Width function that allows you to set the width of your display. Press [CTRL] [3]. If you don't have this updated version, contact LJK Enterprises. —ANTIC ED

MISSING INFOBITS

The assembly language source listing for "Infobits" (Antic, Dec. 1984) was left out of the previous issue. You'll find it in this issue's Software Library. —ANTIC ED

MISSING LINE IN ADVENT X-5

If you're running into a bit of trouble during your adventures in "Advent X-5" (Antic, Nov. 1984), it may be due to a missing line. Add the following line: 8020 R/IN. If the program locks up, you may be mistyping line 1005. The "TYPO II" code for that line is FJ. Watch out for the character just before the inverse f in that line, it's a [CTRL] [B].

LITTLE BROTHER INSTALLED PROPERLY

I have found a problem with the installation of a color monitor with my Atari 400.

I used your article "Little Brother Grows Up" (April 1984) for a guide. The schematic on page 106 shows resistor R11 to have a value of 2.2 Ohms. This should be 2.2 kilo Ohms.

Matt Orsée
Budd Lake, NJ

Thanks—this is the first time we've heard about this. It's harder to test hardware fixes than it is to try new software, and we appreciate all the comments we get.

—ANTIC ED

BIFFDROP

Last month's Game of the Month, "Biff-drop," by J.D. Casten had some pretty tough lines to type in. Now that we have a new "Typo" program, we thought you might like the "Typo II" line-by-line codes followed by the line numbers. See the "Typo II" instruction article in this issue.

MH 510	JE 4002
BQ 515	SB 4003
UC 520	CO 4004
BT 525	YA 4005
AV 580	YA 4006
IV 4000	MM 9000
KP 4001	

ANTIC 4/5 EDITOR

Because of some interesting quirks in the Atari XL screen editing system, the DEMO listing of the "Antic 4/5 Editor Animator," (page 66, October 1984), will not run without the Translator disk. To get DEMO to run without Translator, change both 36's in line 52 to 35, and change the 39 in line 522 to 38.

PLAYFUL PROFESSOR

We would like to thank you for the honorable mention given to us in the October 1984 issue of Antic for our Playful Professor Math Tutor. However, there is a cassette version for the Atari.

Roger Shiffman
Screenplay Intelligent
Statements
Des Plaines, IL

MISSING TANK LINES

In our September Help! column, we ran a letter with improvements for "Use BASIC to Animate". Unfortunately, some lines were omitted from the letter. We print them below.

Add these lines.

```
1301 POKE 752,1:7 :? "MUMB
ER OF PLAYERS (2,3, OR 4)"
::INPUT K
1302 IF K<2 OR K>4 THEN ?
1303 ? CHR$(125):GOTO 1301
1305 ? CHR$(125)
1351 IF K<3 AND K>4 THEN
POKE 53249,0
1352 IF K<4 THEN POKE 532
50,0
```

Change these lines to read:

```
1170 D1=D1+1:IF K=4 THEN A
=PEEK(6344):ON (A=7)+2*(A=
11)+3*(A=13)+4*(A=14) GOS
UB 590,660,730,800:POKE 53
270,1
1180 D2=D2+1:IF K=3 OR K=4
THEN A=PEEK(6333):ON (A=7
)+2*(A=11)+3*(A=13)+4*(A=1
4) GOSUB 310,380,450,520:
POKE 53270,1
```

Note that line 1180 is overlong and must be entered without spaces.

STARTING A BULLETIN BOARD PART II

Antic Pix BBS Software

by SUZI SUBECK

You read last month's *Antic* article about starting your own bulletin board and you've had an extra phone line installed. You're ready to dedicate your Atari system to a BBS, but... where do you go from here? This month *Antic* answers two of the most frequently asked telecomputing questions, "What is the best BBS equipment—and where can I get it?"

First of all, there is no standard "best" configuration for an Atari-based bulletin board—literally dozens of combinations of equipment will work. What's best for you depends on your overall BBS goals, as well as the amount of cash you can spare for this project.

HARDWARE

The heart of a BBS is an auto-answer modem, which will allow your system to function in your absence. Certain modems require the currently hard-to-find Atari 850 interface. You will also need a printer and disk drives. The number and capacity of drives you use will determine the amount of programs you can upload and download.

The annual Buyers' Guide in *Antic* last month gave you our picks of the best modems, disk drives and printers at various price points and with a wide range of features.

SOFTWARE

Probably the most important factor in choosing BBS software is to make sure it's compatible with your hardware—and does all the jobs you want. There are several types of bulletin board software (Also see *Antic*, July and August, 1984). Here's where to get the most popular BBS operating programs:

FOREM will run on any Atari with one to four disk drives of any density—including both 5 1/4-inch and eight-inch disk drives. There are versions that operate with the Atari 850, the ATR 8000 CP/M interface, and other configurations. One version is tailored specifically for the MPP modem.

Matt Singer, the author of FOREM, sells all versions of the software from his Maryland home, with the exception of the latest MPP version which is sold directly by MPP for \$50. Singer is currently selling FOREM XL for \$100. Once you have purchased a program from Singer, regular updates are available for downloading from his BBS, or you can get updates by sending him a blank disk with \$5 for postage and handling.

AMIS software is in the public domain. Easily downloaded from various bulletin boards, AMIS comes in three main varieties, MACE AMIS,

Standard AMIS and Fast AMIS.

MACE stands for Michigan Computer Enthusiasts. And this large users group makes the software available from the Main MACE and MACE West boards at least twice weekly. It's a good idea to call ahead and find out what nights AMIS will be offered.

Standard AMIS is regularly available for downloading from the CLAUG BBS. From time to time, it is also found on most other boards running AMIS. You can also get it by sending a blank disk and return postage to the sysop of just about any regular AMIS BBS.

Fast AMIS has built-in modem commands for a Hayes Smartmodem. It requires some modification to run with an MPP, Signalman Mark 7 or Mark 12 modem. Fast AMIS requires a different method of auto-answer than other BBS programs, and demands a different setting of the modem's internal DIP switches.

Fast AMIS is one of the easiest programs to run because it's virtually self-maintained. Message files compact automatically. The program does not require a printer on-line as FOREM does, and the only jobs the sysop must perform are erasing the caller log and rotating uploads and downloads regularly. Fast AMIS is available

Continued on page 14

CAN YOU SURVIVE 50 MISSION CRUSH?

50 MISSION CRUSH™, SSI's exciting and unique role-playing wargame, puts you in the cockpit as pilot of the most glamorous bomber of World War II—the B-17 Flying Fortress.

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The more points you get, the closer you'll be to a promotion, and ultimately to wearing the General's shiny star.

This game's designer was the flight

engineer on a B-29 bomber during the Korean War, and he's made sure everything about 50 MISSION CRUSH is historically accurate.

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STARTING A BULLETIN BOARD

continued from page 12

for downloading from the Valley Girl BBS at least once a week or by request.

Carnival software is essentially AMIS with an overlay to allow for private messages and passwords. It's no longer available from regular sources, but presumably could be obtained from a private owner. Carnival fell from wide usage because it demands a large amount of disk space and requires every bit of memory your system has.

If you plan to operate your BBS with an ATR 8000, you'll need to use MYDOS to boot the RS-232 handler, which will allow you to communicate with your modem. Because MYDOS returns different RS-232 status values than does Atari DOS, and because MYDOS has a different directory structure, you will probably need to modify any BBS software. Differences from the Atari DOS are pointed out

in the MYDOS documentation.

Most sysops are more than happy to help out a sysop-to-be. They can provide you with a set of guidelines to use in setting up your board. Most of the long established systems you call today have experimented with various configurations of hardware and software, so they can offer excellent advice. Help is only a phone call away.

BBS SOFTWARE SOURCES

Fast AMIS

Public domain from Valley Girl
(312) 747-4247

MACE AMIS

Public domain from Main MACE
(313) 978-1685; MACE West
(313) 582-0657

STANDARD AMIS

Public domain from CLAUG
(312) 889-1240.

FOREM XL

\$100. Matthew Singer, 6005 Cherry-

wood Court, Apt. 301, Greenbelt, MD, 20770. (301) 474-7583—voice, 5-8 PM, EST. (301) 474-7591—modem, 24 hours.

FOREM MPP

\$50. Microbits Peripheral Products, 225 W. Third Street, Albany, OR 97321. (503) 967-9075.

Antic Contributing Editor Suzi Subeck is a sysop and users group newsletter editor based with her family in the southern suburbs of Chicago

BIGGEST BBS LIST STARTS NEXT MONTH!

Starting with February, in the next few issues of Antic we'll print the most complete and current list of Atari bulletin board systems we know of. This list is compiled by the Boise Users Group BBS, it's updated bi-weekly, and names close to 250 active Atari boards.



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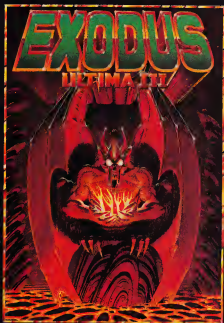


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BASIC SEARCHER

"Global search" for programmers

by SCOTT SHECK

Global search is one of the most useful editing functions found in good word processing software. Now you can make use of the same powerful editing tool when you're revising or debugging your own BASIC programs.

BASIC Searcher is a utility that can find all the lines containing any BASIC command, operator, function or variable in your program. It is compatible with BASIC XL (O.S.S.) and can be used with any BASIC program having line numbers below 31900.

First, type in the program listing, check it with TYPO II, and LIST it to disk using LIST "D:SEARCH.LST". Cassette owners should type LIST "C."

HOW TO USE BASIC SEARCHER

Once the computer has a BASIC program in memory, type ENTER "D:SEARCH.LST" or "ENTER C." to merge your program with BASIC Searcher. Your program MUST be in memory before you ENTER the BASIC Searcher program!

Next, type GOTO 31900. After a brief pause, a list of your program's variables will appear on the screen. Occasionally, this list will include variables which no longer exist. This occurs because BASIC Searcher references your program's Variable Name Table which, in the case of a SAVEd file, may have retained previ-

BASIC Searcher finds the lines containing any command, operator, function or variable in your BASIC program. The program works on all Atari computers of any memory size. Antic Disk subscribers, follow the directions in the article.

ously deleted variables. To clear the Variable Name Table, LIST your program to disk or cassette, type NEW, and ENTER your program again.

Each variable in the list will be accompanied by a reference number. To locate a particular variable in your program, type in its corresponding reference number and press [RETURN].

Now, type [S] to have your results printed on the screen, or [P] to have your output sent to a printer.

The program will print an "END OF SEARCH" message when it's through. If you want to perform another search, type [Y]. If not, type [N] and BASIC Searcher will erase itself from your program.

BASIC Searcher can also find BASIC reserved words, constants and character strings. Just type in a reference number from the accompanying Table. If you were looking for every occurrence of the POKE command, for example, you'd type in [31] and press [RETURN].

Although BASIC Searcher will find

all references to specific variables, it cannot isolate individual constants or character strings. If you're searching for constants (reference number 14) or strings (number 15), BASIC Searcher will print out *all* references to *every* constant or string in your program.

HOW IT WORKS

BASIC Searcher looks for *tokens*, the one-byte codes which the Atari's BASIC interpreter uses to represent reserved words, variables and other pieces of information.

Tokens for BASIC reserved words are represented by ATASCII characters 0 through 84. The computer represents your program's variables with ATASCII characters 128 through 255. (This is why a program may not have more than 128 variables.)

As the computer interprets a BASIC program, each variable is assigned a token, beginning with ATASCII 128, and this token is appended to the Variable Name Table. At the same time, the variable's name is added to the Variable Name List, and its value is stored in the Variable Value Table. The computer uses these tables to keep track of your program's variables. BASIC Searcher looks through the Variable Name Table and the Variable Name List when analyzing your program.

continued on next page

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REFERENCE NUMBER TABLE

0	REM	43	GRAPHICS or (
1	DATA	44	PLOT or)
2	INPUT	45	POSITION or = [arithmetic]
3	COLOR	46	DOS or = [strings]
4	LIST	47	DRAWTO or <= [strings]
5	ENTER	48	SETCOLOR or <>
6	LET	49	LOCATE or >=
7	IF	50	SOUND or <
8	FOR	51	LPRINT or >
9	NEXT	52	CSAVE or =
10	GOTO	53	CLOAD or + [unary]
11	GO TO	54	Implied LET or -
12	GOSUB	55	ERROR [syntax] or ([strings]
13	TRAP	56	([arrays]
14	all constants or BYE	57	([DIM arrays]
15	all strings or CONT	58	([functions]
16	COM	59	([DIM strings]
17	CLOSE	60	([arrays]
18	CLR or	61	STR\$
19	DEG or S	62	CHR\$
20	DIM or	63	USR
21	END or ;	64	ASC
22	NEW	65	VAL
23	OPEN	66	LEN
24	LOAD	67	ADR
25	SAVE or TO	68	ATN
26	STATUS or STEP	69	COS
27	NOTE or THEN	70	PEEK
28	POINT or *	71	SIN
29	XIO or <= [arithmetic]	72	RND
30	ON or <>	73	FRE
31	POKE or >=	74	EXP
32	PRINT or <	75	LOG
33	RAD or >	76	CLOG
34	READ or =	77	SQR
35	RESTORE or	78	SGN
36	RETURN or *	79	ABS
37	RUN or +	80	INT
38	STOP or -	81	PADDLE
39	POP or /	82	STICK
40	? or NOT	83	PTRIG
41	GET or OR	84	STRIG
42	PUT or AND		

Scott Sheck is one of the most creative and prolific utility programmers appearing in Antic. Last month's issue featured his "Word Storage Space

Saver," an almost fiendishly clever method of reducing memory waste in text storage.



Listing on page 53

Introducing

TYPO II

Easier proofreading for Antic type-ins

TYPO (Type Your Program Once) by Bill Wilkinson of Optimized Systems Software started in the third issue of *Antic*—August, 1982. It was the first automatic proofreading program for type-in listings ever printed in a computer magazine. We reprinted TYPO several times and have been using it with all our listings ever since—but now TYPO is going into a well-deserved retirement.

ENTER TYPO II.

The main trouble with the original TYPO is that it didn't show exactly what line contained a typing mistake. This made it too hard for beginners to use comfortably.

But TYPO II pinpoints every mistyped line—immediately after you type it. It can also find transposed characters which were invisible to its predecessor.

TYPO II even lets you use abbreviated commands. But don't mix up PRINT with [?].

Antic tapped Andy Barton ("Info Bits," Dec., 1984) to write TYPO II. Andy cheerfully put the program through an extensive debugging process to make it compatible with all Atari computer models. Then when we believed the program was perfected, we asked Bill Wilkinson to look at it. And Bill contributed some

ideas that enabled Andy to make TYPO II even shorter and simpler.

—ANTIC ED

HOW TO USE TYPO II

TYPO II finds the exact lines where you make mistakes while typing in *Antic* BASIC listings. This short all-BASIC proofreading program starts in the January 1985 issue, it works with all Atari computers of any memory size.

Type in TYPO II and SAVE a backup copy to disk or cassette. (Users of the O.S.S. Basic XL cartridge must type SET 5,0 and SET 12,0 before they RUN the program.) To start TYPO II, type GOTO 32000. The TYPO II screen should appear, displaying the instruction, "Type in a program line."

Respond by typing in the first line of any 1985 *Antic* BASIC program. You will see the line reappear near the bottom of the screen—with a two-letter code at the left of the line number. Check these code letters against the correct two-letter code printed left of the same line in the magazine listing.


If the codes don't match exactly, you mistyped something in that program line. Simply press [RETURN] and the line will move back towards the top of the screen for editing. Don't type in those two-letter correction codes as part of the program line.

When the codes are an exact match, just type the next program line.

IMPORTANT: To call up *ANY* previously typed line for checking with TYPO II, type an asterisk [*], followed (with no spaces in-between) by the number of the first program line you want to proofread. Then press [RETURN]. Use this procedure to check every line of TYPO II before you proofread other *Antic* programs with it.

You can LIST your program by pressing [BREAK] and typing LIST. Switch back into TYPO II anytime by typing GOTO 32000.

To remove TYPO II from your program: Type LIST "D:FILENAME",0,31999 (Cassette owners LIST "C:",0,31999). Type NEW, then ENTER "D:FILENAME" (ENTER "C:" for cassettes). Your program is now in memory without TYPO II and can be SAVEd or LISTed to disk or cassette.

(Of course, if you still get tired of typing in all six-or-more listings per issue—you can subscribe to *Antic* Magazine+Disk for only \$99.95 yearly, and send for back issue disks at just \$12.95 each. See order forms in this issue.) 

Listing on page 52

INTERVIEWING DAN BUNTEN

Designer of "Seven Cities of Gold" & "M.U.L.E."

by ARTHUR LEYENBERGER

Ozark Softscape is located in the game design botched (?) of Little Rock, Arkansas and it has created two of the most impressive games available for the Atari—the 1983 award-winning science-fiction economic simulation M.U.L.E. and 1984's graphics-scrolling conquistador simulation Seven Cities of Gold. Both of these remarkable games are marketed by Electronic Arts (2755 Campus Drive, San Mateo, CA 94403, 415-571-7171).

The principal game designer and most visible spokesman of Ozark Softscape is Dan Buntin, whose earlier games include Computer Quarterback, Cytron Masters, and Cartels & Cutthroats.

The rest of Ozark Softscape consists of:

Bill Buntin, Dan's brother, who has a Master of Business Administration degree and shares the design responsibility with Dan as well as being the primary play tester.

Jim Rushing, another MBA, who is kept busy writing most of the heavy-duty number-crunching code for the Ozark games.

Alan Watson, whose specialty is graphics and animation programming. He has a math background and ten years' experience in high-end stereo retailing.

Ozark Softscape has developed a game development routine, during its two years of existence. All four members decide what type of player

experiences they want in their next game. Then Dan or Bill will produce a topic, flesh it out and bring it in for discussion. After the opening rounds, Dan and Bill come up with a game skeleton, including memory requirement estimates. From there, the work, and the fun, really begins.

Dan Buntin does not fit the programmer stereotype. Although he is an engineer by training, he prefers not to talk of bits and bytes but about what can be created with leading-edge technology. His interests range widely, from social biology to science-fiction, from philosophy to history and education . . .

Antic: How did you get the idea for Seven Cities?

Buntin: When my brother Bill and I were kids, my uncle gave us a book on the Conquistadors and we thought, Wow! Then there was a strategy board game from SSL, a war game called Conquistador that was part of their magazine. That was neat but it was awfully unplayable. We had a list of themes that were of interest to us and when we were ready to begin a new project we did not want to do another multi-player game like M.U.L.E. So we looked down the list and said, "Here's Conquistador."

Actually, we were not too excited about it at first. But as we started to do the research on it, we thought we could really do something good. After two months of research and just free-flowing ideas, we spent another

month writing the story boards. Then six months of coding and it was out.

Antic: How far into the initial research phase do you go before you decide whether the concept will succeed?

Buntin: Normally, we just try to push through. To a certain extent we can always figure something out. Since there are a lot of people involved somebody will usually have an idea. There are the four of us in Ozark Softscape, there's our publishers at Electronic Arts, our play testers—somebody is going to come up with something.

The big idea with Seven Cities is the concept of Discovery. We have a giant world; spread it out, and it would be 12 by 20 feet. You are sitting there with a 3-1/2 inch window on this 12 by 20 foot world. That's big. You will never have a sense of knowing everything. You get lost or end up in the boonies.

The other things were to keep a pace going, to be fun, be easy. To transfer things was the most awkward part of the game. Yet it is actually pretty simple compared to other alternatives. But next time we will do those even better.

Antic: I think the game really does capture the flavor of what the Conquistadors must have been feeling. Especially with the random continent feature.

Buntin: Yes, in a random continent game, even when you find land, you

don't know what will be there. You can end up with a randomly generated continent full of a higher tech civilization than the Europeans.

Our model for that was the Japanese and Chinese. If the Conquistadors had landed in China or Japan, the Europeans would not have had a chance. They couldn't have come in and said, "We are going to blow you away and take everything you've got." They would have been lucky to get enough food to go back home.

Antic: When I first received *Seven Cities*, I thought, "Oh no, the manual doesn't tell you anything!" Then I started playing the game and figuring things out. The manual gives a historical perspective.

Bunten: Most people would just start playing the game. We looked at the possibility of not having to use a manual. We gave our testers just a disk and didn't say anything. It didn't go over wonderfully but some people loved the idea of discovering all of it.

And then I would get a call from somebody saying, "I can't get off my ship." They had never pushed the button standing still, to find the pull down menus. And "Drop Stuff Off" didn't sound like how you would get off your ship. Some of that has to be explained.

Antic: I thought "Drop Stuff Off" sounded a little strange.

Bunten: We pondered over that. If Antic readers can come up with a better phrase, we might even change it for the next version of the game. We were going to drop "stuff" off (a Spanish word for it). We thought about "Transfer". Actually it was my wife's idea. I explained to her that what we were trying to do was drop stuff off, and she said why don't you just call it that. So we put it into a preliminary version and it stayed.

Antic: One feature of *Seven Cities* that I find difficult to understand is the way you might bump into the natives and accidentally kill them.

Even when I am very careful, I still end up killing a few innocent natives.

Bunten: Because you don't share a language with the natives, your only

way of communicating is by the gestures you make . . . your body language. All the natives can look at is

continued on page 23

In *Seven Cities of Gold* you're a Conquistador and ship captain searching for new worlds and treasure.

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Ozark's other game, *M.U.L.E.*, takes place on a distant planet, where up to four players (only two players if you have an Atari XL) must either compete or cooperate to colonize this world in the allotted food, energy, *Smithore* and *Crystite*

time. The four basic commodities—are used by the players to increase their wealth and the overall well-being of the settlement.

M.U.L.E., for "multiple use labor element," represents a machine that allows colonists to get things done. During each round, players must vie for plots of real estate. Then they choose whether to produce energy or food, or to mine their land for *Smithore* (used in the manufacturing of *M.U.L.E.*s) or *Crystite* (much like diamonds). Players then sell surpluses and buy commodities.

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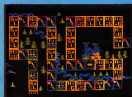
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INTERVIEWING DAN BUNTEN

continued from page 21

whether your gestures seem neutral or hostile. The potential for missed cues on both sides is enormous. It may be stretching it, but we actually designed that specifically. Unfortunately it ended up looking like an arcade game that doesn't quite work, because these guys just bump into things and die.

Antic: Do you have any strategy tips for playing Seven Cities?

Bunten: The peaceful approach really works best. I have not used a totally depraved approach and won. You've got to have some friends somewhere. If something goes wrong, you need a friendly mission where you can go back and not have to worry about an insurrection or something. A place you can return to and know that there will be food, for example. You need a series of these relatively safe places even if you are going on a conquest mission.

If you continually abuse the natives you will eventually see a message from the king saying "Don't treat the natives so badly. But keep the gold coming." This double standard is straight out of history.

Antic: You treat the morality question in an interesting way.

Bunten: I do not want to preach to the player what is right and wrong. But I want to give them a chance to get in touch with themselves about how they do feel. In play testing we found that people would rationalize why they used force against the natives. They would say things like, "I only did it because the natives asked for too many gifts". People felt they had to explain their behavior.

Antic: How do you win Seven Cities?

Bunten: However you want. Seven Cities is a process type game; you go along like real life. Life doesn't have ends and wins and things like that. It has processes that you go through and at times you stand back and say, "Hey,



SEVEN CITIES OF GOLD

I've done pretty good so far." Set your own goals really high and say, "That's how I win." Then go for it.

Antic: In a way, this is really a learning game.

Bunten: Learning and fun are not mutually exclusive terms. Play is an important element in our lives. It is unfortunate that as adults we tend to regard play as a separate activity which you do when you have a little free time—rather than say there is a natural joy in learning.

As adults, our real joy comes from learning new things. Discovering or learning something new is done for pleasure. That's what it is all about. Having the opportunity to expand yourself, that's what is entertaining and educational.

Antic: How did you become involved with programming?

Bunten: I started out in Industrial Engineering and one of the first courses we had to take was programming. Fortran on a big IBM. The first time I got it to print $A + B = C$ I was so excited. I did it and then I figured out that I could also make it print out little pictures with letters on a line printer. I thought it was wonderful and I knew someday I was going to have my own computer, but I figured that I would have to be a millionaire first.

As it turned out, I got my first Apple computer in 1979 and I could do things at home. I was working as an Industrial Engineer and had access to a computer at work. So I wrote a few games for the enjoyment of myself

and friends. I did some really goofy stuff.

Antic: Are you limited because of the hardware?

Bunten: That's a cop-out if we blame the hardware. The hardware helps but it isn't all there is. Look at the hardware of a book. I mean it is black and white on a piece of paper and yet it comes across. It's grammar among other things. We don't even know the software's grammar yet, much less how to develop characters and carry a plot line. We have a way to go and are really at the beginning. But it is fun to be part of it.

Antic: What was your first commercial program?

Bunten: Wheeler Dealer. No one remembers it, only a hundred were sold. It was a 16K cassette game for the Apple. Integer Basic, and it required this hardware thing we made ourselves to allow four people to do the bidding in the game.

Antic: Does a person who wants to break into the game design field have to be a super coder?

Bunten: Not necessarily. There are a lot of good designers around who aren't great programmers. But knowledge of coding helps. Because you know the machine and when you push the boundaries you know what you can and cannot do. Knowing about human engineering also helps.

Antic: The human interface is really one of the strong points of Electronic Arts products. Their ease of use is a hallmark.

Bunten: It's amazing—M.U.L.E. was done years ago in an entirely different form for a 16K Apple—a real-time stock market simulation. It didn't go anywhere and probably never could have if it wasn't for a company like Electronic Arts. Their ability to support and guide us and to pull together ideas really helped. And patting us on the back, too, because we need a lot of that. We are out in the boonies and

continued on page 28

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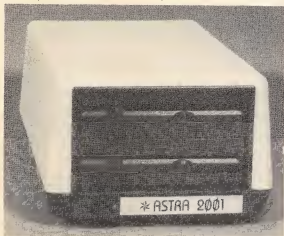
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INTERVIEWING DAN BUNTEN

continued from page 25

the attitude of people we deal with is "You write games for a living?" I really have to justify myself to my in-laws.

Antic: Can you talk about your next project?

Bunten: I could if I knew. We have a lot of ideas though. So we rented two cabins on a lake and are going on a retreat next week where we will relax and talk about what's next.

Antic: To what extent do you think a person's program reflects their personality?

Bunten: To an amazing extent. There are several people that I have not yet met, but I think I kind of know what they are like just having seen their games. You can tell if the guy was willing to get into the nitty gritty with-

out concern for complexity. This is called dirt in war game programming terminology and some people actually enjoy the dirt and they will create games with a lot of it.

Antic: Do you think of yourself as a programmer turned artist or an artist turned programmer?

Bunten: None of the above really. I like the idea of being an artist but I think there is a lot more to be done and it is presumptuous to put that label on yourself. Real artists do things that pull your emotions in. A good film or a good book can play you like a fiddle.

Antic: Doesn't Seven Cities do that? When I get lost at sea for example, I'm very upset. My emotions are drawn in by the game.

Bunten: It is a start, a small step towards being able to do that. We have

learned a little bit and have made a step. But the spectrum of emotions that we can create and trigger in software is limited right now. We are not yet to the point where you are going to cry because your character died. I want that, but we won't see it until the software technology matures more.

Arthur Leyenberger is a human factors psychologist in New Jersey. He does microcomputer consulting and freelance writing. He's been an Atari activist for about three years. In fact, he conducted this interview while waiting at the airport with Dan Bunten after the game design star spoke to a users' group.



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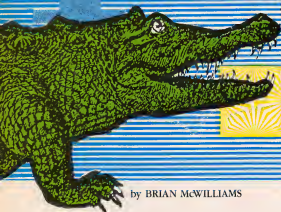
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game of the month



by BRIAN McWILLIAMS

Q.T. is an inventive arcade game boasting three different screens, each with six increasingly nerve-wracking levels of difficulty. The BASIC program runs on all Atari computers with 24K memory for cassette or 32K for disk. Antic Disk subscribers, RUN "D:QT.BAS"

Meet Q.T., a cute little bird who lives inside a dangerous arcade game. If you care about wildlife preservation, you'll help Q.T. survive six increasingly difficult levels of game play—on three different screens.

The first screen is crowded with ice cubes as Q.T. races the timer to put four corner blocks in their assigned positions. Q.T. gets points for eating cubes, or kicking them against the side walls with the joystick button. If the timer runs out before the (inedible) corner blocks are all correctly placed, "Bye bye, Q.T." There's less time at each higher level.

Your score is displayed in the upper left corner, the number of remaining lives is at the upper right. Displayed

at the lower right are all bonus objects collected. High score also remains displayed until the computer is turned off.

A bonus object waits on a platform at the right of the second screen, while a deadly snapping jaw threatens from the left. Q.T. stands at the bottom of the playfield and can only move left or right—while catching objects falling from the top. Every missed object brings the snapping jaw closer; every object caught brings the bonus object nearer. Oh yes, Q.T. must dodge some of the falling objects—birdie-crushing I-beams.

Q.T. takes to the air in the third screen, trying to pop as many balloons as possible. Each balloon carries an item worth points. Q.T. moves left or right with the joystick. Pressing the fire button causes Q.T. to flap. Without flapping, Q.T. glides down. Balloons move faster in the higher levels.

Q.T. can die by gliding off the screen, or by getting crushed with a falling object. If all six levels of the

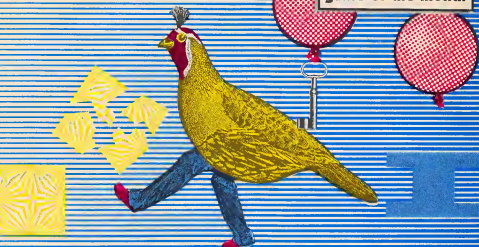
game are survived, Q.T. will be safe at last on the "You Win!" screen.

Type in the Q.T. listing, check it with TYPO II, SAVE a back-up copy and RUN the game. Your screen will go blank for about 10 seconds and then display the title screen. Press the joystick button to start. And be sure to press [RESET] before re-running the game.

Brian McWilliams is 17 and a senior at Alpena High School in Michigan, where he's able to take quite a few computer classes. He's currently working on an action game called "Droids."

Q.T. PROGRAM TAKE-APART

10	Dimension variables
20	Get high score
50-90	Title page
100-160	Main module
200-650	1st board



800-1030	2nd board	MOVES	Holds ML subroutine for moving the character set	INSET	to fall or item attached to balloon
1050-1630	3rd board				Internal character code for character to be changed
1600-1630	Death routine on 3rd board	A	Reads stick position, loop variable, and other various uses	IP	Object or balloon X-position
1640-1710	Q.T. introduces new bonus item			IV	Item value
1800-1840	"You Win!" routine	B,X,Y	Loop variable and other various uses	JUNK	Variable used for USR call
7000-7310	Subroutines			LIVES	Number of lives left
7090	Erase screen	BC	Bird color	LL,LR,UL,UR	Checks corners on first board
7100	Display score	BI	Bonus item color	NH	Number of objects caught
7110-7190	Display lives	BIC	Bonus item counter	NM	Number of objects missed
7130	Display time	BLL	Balloon color	O	Used instead of "0"
7190-7260	Death routine	BLLY	Balloon Y-position	OFF	Used instead of "7290"
7270	Poke high score into memory	BONUS	Bonus accumulator	SCORE	Current score
7300-7310	Takes care of timer	BRD	Board counter	TIME	Time remaining
10000-10060	Changes character set	C	Used to check an object's path for obstacles	XP	X-position of Q.T.
10070-10075	Data for USR call	C1	Use instead of "1"	XX	Loop variable
10080-10180	Character set Data	CC	Check corner blocks' path for obstacles	YP	Y-position of Q.T.
			Reads Data for new character set	Z	Value of bonus item
		CHANGE			
		FR	Falling rate and rising rate for objects or balloons		
		HI	Holds high score		
		IC	Item color for object		

Q.T. VARIABLE LIST

A\$ Holds value of high score before POKEing it into memory

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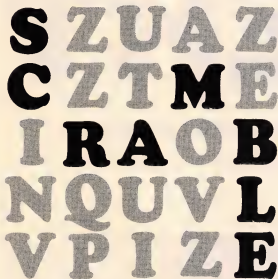
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Scramble is a one-or-two player word game designed to develop vocabulary and spelling skills in a way that's entertaining for all ages. A five-by-five grid of letters is presented to each player. The object is to form words by connecting *adjacent* letters together. The longer the word, the more points you receive. The number of points

letter, mark it, and so on until the word has been spelled out completely. Then position the cursor over any one of these marked letters and press the fire button again to enter the word into a string array, from which your score will later be tallied.

Remember, the letters in the sequence must be adjacent (vertically, horizontally, or diagonally). For example, in the grid below, "darling" is legal while "ding" is not. "Dared" is illegal since a specific letter may be used only once in each word.



Z Z E Z Z
Z D R G Z
Z L A N Z
Z Z I Z Z
Z Z Z Z Z

If you make a mistake while marking the letters, enter the erroneous word anyway; it will be deleted later when the words are reviewed at the end of the round.

The program surveys each player's set of words and deletes any duplicates. That is, if you enter the word "dog" twice in the same round, the second instance will be disregarded. Any duplicates will be displayed one at a time at the top of the screen, above the appropriate player's board. Press either fire button to pause during the review process.

Each player's words are presented for acceptance or rejection. A dictionary comes in handy here. Press either joystick to the left to accept a word and add its value to the player's score, or to the right to reject a word. After scoring is completed, if the minimum winning value has been reached, a winner is declared. Otherwise a new round is begun.

F. Neil Simms is a graduate student in Computer Science at Union College in Schenectady, New York. He started programming games on his Atari about two years ago, but now concentrates on utilities and graphics programs.



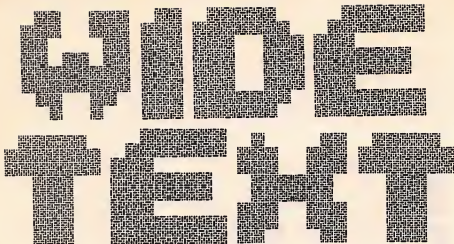
Listing on page 57

by F. NEIL SIMMS

required to win may be chosen by pressing the SELECT key at the beginning of the game. Words must be between three and ten letters long.

To play, first type in the listing, check it with TYPO, and SAVE an extra copy for safety.

Each player competes simultaneously by manipulating the cursor around each board with his or her joystick (plug the joysticks into ports number 1 and 2). When the cursor is positioned over the first letter of a word you have spotted, press the fire button to mark the letter. Proceed to the next



Bold letters beef up graphics 0

by BILL MORRIS

It's been accepted as fact that you have to fold, spindle and mutilate the Atari display list in order to print bold, double-width Graphics 1 letters on a screen in the standard text mode, Graphics 0.

Even after you went through all this programming effort, you still wouldn't be allowed to put Graphics 1 letters on the same line as Graphics 0 letters. And inverse video Graphics 1 letters were completely out of reach.

WideText neatly solves all three problems. It's a short assembly language subroutine that lets you put standard or inverse Graphics 1 letters *anywhere* on a Graphics 0 screen. And you don't have to struggle with the display list.

You can use the WideText subroutine in your own BASIC or

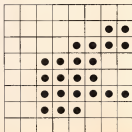
The easiest and most powerful method ever developed for inserting bold double-width Graphics 1 letters anywhere on the screen in Graphics 0, the standard text mode. Works with all Atari computers of any memory size. But if you want to use the included source code, you'll need either Atari Assembler Editor or MAC/65. Antic Disk subscribers. RUN "D:WIDETEXT.BAS"

machine language programs. Antic is publishing WideText here in a longer BASIC demonstration version. The actual subroutine is in binary load format in lines 6400-6520 and 20000-20280. We're also providing the assembly language source code for the subroutine.

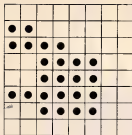
HOW IT WORKS

WideText redefines portions of the computer's character set to simulate the Graphics 1 letters. For example, the letters [CTRL] [A] and [a] have been redefined to look like:

[CTRL] [A]



[a]



Now when [CTRL] [A] and [a] are printed next to each other, they look like an "A" in Graphics 1. It works the same way with any other letter. If you want a Graphics 1 "X," you type [CTRL] [X] and then [x]. WideText only works for letters, not with numbers, punctuation marks, or special characters.

The routine that does this is in lines 20000-20280. You can use it to mix Graphics 0 and Graphics 1 letters in your own BASIC programs. Once included in your program, you can turn it on with the statement X=USR (1536).

You can also type with WideText's simulated Graphics 1 letters. First, set the variable WIDE equal to [1]. Now as you're typing, the routine in lines 6400-6520 substitutes the wider Graphics 1 characters on the screen for each Graphics 0 letter. To type with Graphics 0 letters, set WIDE to [0].

HOW TO USE WIDETEXT

Type in Listing 1, check it with TYPO II, and SAVE a backup copy. When you type RUN, the program will cycle through a demonstration of how WideText prints messages on the screen. You don't need to type either Listing 2 or Listing 3 in order to use Listing 1.

USING ASSEMBLY LANGUAGE WIDETEXT

Listing 2 is the WideText assembly language source code. To use it you need either an Atari Assembler Editor or O.S.S. MAC/65 cartridge. SAVE a

backup copy after you type it in. Antic Disk subscribers, ENTER #D:WIDETEXT.ASM

Once a machine language program is assembled and you SAVE it as object code, it can become part of a BASIC program if it starts with a PLA instruction and ends with an RTS instruction.

Before BASIC can use object code, the code must be converted into DATA statements. Listing 3 will load the converted object code by POKEing this data into memory.

First, save the assembled machine code on a disk by typing SAVE #DPAGE6.OBJ<600,6FF

MAC/65 owners, type:

ASM, #D:PAGE6.OBJ

If you wish to save the source code too, type:

LIST #D:WIDETEXT.ASM

Next, turn off the computer. Then reboot it with BASIC DOS. Use option L to load the machine-language routine into Page Six.

Exit DOS and use Listing 3, the PEEKER program, to generate the necessary DATA statements. Type in Listing 3, check it with TYPO II and SAVE a backup copy before you RUN it. Antic Disk subscribers, follow the applicable instructions above before using the DATA statements it generates.

IMPORTANT: Remember to delete the PEEKER program before using the DATA statements it generates.

Listing on page 99

ASSEMBLY LANGUAGE TAKE-APART

This take-apart is for Listing 2, the assembly language source code of the DATA statements in Listing 1.

130-190 Sets the variables. Page Zero locations must be chosen carefully, since few are safe from BASIC.

200 Holds the starting address.

210 The PLA at the beginning of a machine-language subroutine exposes the Return-To-Basic address

on the 6502 stack.

220-370 Finds a 1K block of memory just below the bottom of screen memory and copies a slightly modified version of the ROM character set.

410-420 Stores unchanged copies of numerals and punctuation marks.

430-440 Stores unchanged versions of capital letters.

450 Uses the variable ONECHAR to store an extra copy of each value.

460-500 Shifts all bits in ONECHAR four places to the right, and stores the value in HALFCHAR.

510-520 Delete the leftmost four bits of ONECHAR.

530-540 Calls a subroutine that expands four-place bit patterns into eight-place bit patterns. Then, this new byte is stored as a control character. Eight of these bytes will form the right half of a wide letter.

550-580 Deletes the leftmost four bits of HALFCHAR, stretches the patterns to eight bits, and stores this new byte as a lower case letter. Eight of these bytes will form the left half of a wide letter.

590-620 Repeats character-redefining steps 208 times until we have a new alphabet. (26 letters x 8 bytes per letter = 208.)

630-730 Finishes copying and storing the character set.

740-750 Updates the character base pointer, 756 (\$02F4).

760 Contains the "Return from Subroutine" (RTS) instruction.

Bill Morris is a San Francisco taxi driver. He just walked into Antic one day with the WideText program. He also showed us his outstanding almost-finished machine language action game called Taxicab Hill.



Touch Tablet

Here is an idea whose time has come: Touch tablets are the best off-keyboard controller devices.

Various computer magazines have recently pointed out that the touch tablet is a lot easier and more natural to handle than the joystick, paddle, track-ball, custom keypad—or even those highly-routed and expensive newcomers, the mouse and the touch-screen. And just as *Antic* went to press, Koala Technologies Corp. unveiled an over-\$150 KoalaPad business applications controller for the higher-priced microcomputers.

This program lets you use the same principle with your Atari. You can incorporate Touch Tablet Controller into any BASIC program where the user must point to specific places on the screen. There's no reason why your KoalaPad or Atari Touch Tablet must be limited exclusively to graphics input.

Your computer "sees" the tablet as a pair of game paddles. The position of the stylus on the tablet's flat surface is defined by horizontal and vertical coordinates. The horizontal coordinate is read as PADDLE (0) and the vertical coordinate as PADDLE (1).

Similarly, the two touch tablet buttons are treated as game paddle trigger 0 (left button) and 1 (right button). Touch tablet buttons can also be read with the STICK (0) function as follows:

*Control the cursor in your own BASIC programs with a KoalaPad or Atari Touch Tablet. Perfect for selecting menu options or educational quiz answers. The program works on all Atari computers of any memory size. *Antic* Disk subscribers, RUN "D-KOALA.BAS"*

STICK (0) = 15 No buttons pressed
= 11 Left tablet button
= 7 Right tablet button
= 3 Both tablet buttons
= 14 Touch Tablet Stylus
= 10 Stylus + left button
= 6 Stylus + right button
= 2 Stylus + both buttons

Unlike joysticks or game paddles, touch tablets can get from point A to point B while skipping all points in-between—not unlike a disk drive. We'll use this feature to create a tablet-controlled cursor. We'll also demonstrate how to use this cursor to choose options from menus and select answers in educational quizzes.

After you have used Touch Tablet Controller for a while, you'll probably think of other applications it can be adapted for. Please write to *Antic* about your discoveries, so other readers can share them.

USING THE PROGRAM

Type in the program, check it with TYPO II and SAVE a backup copy.

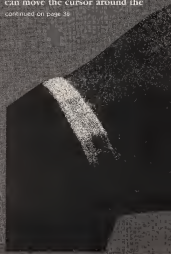
If you are using an Atari Touch Tablet: At the start of line 70 you must [DELETE] 70 REM (which will give you a substituted line 60). Also, in line 40 change 1593 to 1596. Press [RETURN] after making each of these changes.

Now plug your KoalaPad or Atari Touch Tablet into joystick port 1 and type RUN.

There is a brief delay while the program starts. You will see a menu display with four options. Press the stylus against the touch tablet and a diagonal arrow appears on the screen. The arrow's color continuously pulses and changes.

This arrow is your cursor. You can move the cursor around the

continued on page 36



Cursor

by KARL WIEGERS



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TOUCH TABLET CURSOR
continued from page 36

screen by sliding the stylus on the touch tablet. Lift the stylus and the cursor disappears.

The cursor will not be visible when the stylus is near the left or right edges of the tablet. This happens because most TV sets are only able to display horizontal coordinate values between 48 and 210.

Point the arrow toward one of the menu items and press a touch tablet button. You'll see a display telling you that your selection was accepted and the program branched properly. Menu option two shows how to use the touch tablet to select answers to questions printed on the screen. Press any touch tablet button to return to the main menu.

This example illustrates how easily a touch tablet can be used to indicate screen positions and accept input from the user.

HOW THE PROGRAM WORKS

In BASIC, paddles 0 and 1 are read by PEEKing memory locations 624 and 625. The range of possible values for horizontal and vertical coordinates on the KoalaPad are 3 (extreme left or top) through 228 (extreme right or bottom). For the Atari Touch Tablet it's 9 (extreme left or bottom) and 228 (extreme right or top). If the stylus is not pressed against the tablet, the default paddle values are 3 for the KoalaPad, and 228 for the Touch Tablet.

The arrow cursor is set up as player 0, using single line resolution. A vertical blank interrupt (VBI) machine language routine is used to read the position of the stylus and set the horizontal and vertical positions of the cursor. The VBI also changes the color of the player 15 times per second to create the pulsing effect. Using a VBI like this allows the touch tablet to be read frequently without interfering with the rest of the BASIC program. The VBI

routine is turned on in line 370 with the statement A =USR(1536), and can be turned off with A =USR(AD).

Lines 260-310 set up a simple menu in Graphics 1. Line 400 loops until one of the touch tablet buttons is pressed. Lines 420-450 evaluate the vertical position of the stylus (PEEK(205)) and branch to appropriate routines for the different menu options. The button is ignored if the cursor is not pointing at one of the available options (line 460).

Options one and three show a screen display and wait for a button press to return to the menu (lines 470-520 and 680-730). The VBI is turned off when reaching these displays, so you won't see the arrow.

Option two poses a simple addition question and lets the user select an answer with the stylus and button. Line 590 evaluates the vertical coordinate of the cursor, and line 600 judges the horizontal coordinate. The empty FOR-NEXT loops keep the computer from reading the touch tablet button too rapidly.

The QUIT option in the menu goes to an exit routine at lines 740-760. This removes the cursor from the screen and turns off the VBI.

Karl Wieggers is a Ph.D. research chemist for Kodak in Rochester, NY. He's also a regular Antic author, specializing in graphics applications.

MANUFACTURERS

ATARI TOUCH TABLET
Atari Corp.

1265 Borregas Avenue
Sunnyvale, CA 94086
(408) 745-2000
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Listing on page 61.



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DISKIO is a superb enhancement for DOS 2.0S. For openers, it provides access to nearly all the DOS functions directly from BASIC or Atari Assembler Editor. It also has an alphabetical disk directory display and needs only a few keystrokes for disk file operations. DISKIO works on any Atari computer with one or more disk drives. Antic Disk subscribers, RUN "D:DISKIO.BAS".

The day DISKIO arrived at Antic it became our in-house disk utility. It's that good!

DISKIO is a disk operations program that resides safely in memory and provides access to nearly all of the functions of DOS 2.0S directly from BASIC or from the Atari Assembler Editor cartridge. A number of similar "miniDOS" programs have appeared in various articles, but DISKIO removes the need for DUP.SYS more completely than any of these.

Moreover, DISKIO has a number of features that make it outstandingly easy to use, such as a two-column listing of the disk directory that is alphabetized and numbered, shortened commands that use those numbers, and a HELP menu that makes nearly everything self-explanatory.

Incredibly, that's not all! DISKIO also verifies poten-

memory automatically. A message will be displayed indicating that DISKIO is present and suggesting that you type HELP [RETURN] to see the commands. If you do so, the HELP menu will appear on the screen:

DISKIO COMMANDS

DIR	Directory
DIRn	Dir. Drive n
FORMAT	Format disk
WDOS	Write DOS.SYS
.X->LI->	LISTD List to disk
.S->S. ->	SAVE Save to disk
.E->E. ->	ENTER Enter to mem.
.L->LO->	LOAD Load to mem.
.R->	RUND Run disk file
.K->	LOCK Lock file
.U->UN->	UNLOCK Unlock file
.N->RE->	RENAME Rename file
.D->DEL->	DELETE Delete file
.B->BL->	BLOAD Binary load
.M->M. ->	MOVE Move file
R9 runs #9 etc. To use DOS type	
KILL. Reboot to restore DISKIO.	

DISKIO

tially destructive commands, prevents renaming to an existing name, and is full compatible with the Atari BASIC and Assembly Editor cartridges.

Oh yes . . . and DISKIO occupies only 3K of memory, that's 25 disk sectors compared with 42 sectors for DUP.SYS. —ANTIC ED

READING DISKIO

Use a disk containing DOS 2.0S (if the DOS.SYS file is 39 sectors long it should be okay). Type in Listing 1 exactly as it appears. The program is designed to check itself, but if you use the new TYPO II, you'll be able to find typing mistakes right after typing each line. Once you have the program correctly typed in, SAVE a backup copy then RUN it. The message "READY TO CREATE AUTORUN.SYS FILE?" will be displayed. Type [Y] and DISKIO will be created on disk as AUTORUN.SYS.

USING DISKIO

Boot your system with the disk containing the new AUTORUN.SYS file you just created, plus either Atari BASIC or Assembly Editor. DISKIO will be loaded into

The first column of the HELP menu lists the abbreviated .C commands which allow files to be designated by number rather than by name. The second column lists the abbreviated forms of the commands, the third lists the full command names, and the fourth gives a brief definition. Type DIR [RETURN] and the disk directory will be displayed in a manner similar to the one below:

SAMPLE DISKIO DIRECTORY

1 ASMSRCH OBJ 002	8* DUP	SYS 042
2 ASMSRCH SRC 028	9 HMSG	SRC 010
3* AUTORUN SYS 025	10 RNMCCHK	SRC 021
4* DISKIO OBJ 025	11 RTNLNTX	SRC 004
5* DISKIOC SRC 168	12 SCRST	SRC 051
6* DISKIOZ SRC 175	117 FREE SECTORS	
7* DOS	SYS 039	

Notice that the directory is displayed in two columns, with the file names alphabetized and numbered. Up to 41 file names can be displayed simultaneously.

The DIRn command is discussed in the "Two Disk

Drives" section. The **FORMAT** command will format your disk after two safety prompts. The **WDOS** command will write **DOS.SYS** to the disk, but not **DUP.SYS**. The latter can be copied from another disk using the **MOVE** command (see below).

The **.C** commands (column 1 of the **HELP** menu) consist of a period, the command letter, and the file number. To use these commands the file name must be up on the screen as a result of a previous **DIR** command. For example, if **12*MYFILE.SAV** is displayed, instead of typing **RUN"D1:MYFILE.SAV [RETURN]**, all you have to type is **.R12 [RETURN]**. You can rename a file by entering the following sequence of commands: **.N12,NEWFILE.SAV [RETURN] [Y]**. The **[Y]** is there because you are asked to verify all **.C** commands that might destroy data on the disk. To lock **NEWFILE.SAV** you would type **DIR** and then a **.K** command with the new file number.

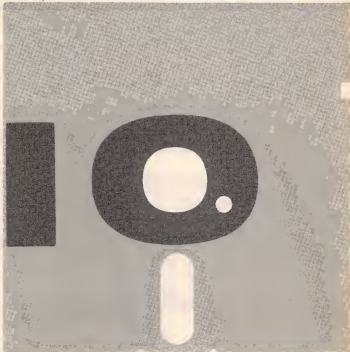
Columns 2 and 3 of the **HELP** menu show the abbrevi-

ated and full commands which will require file names as part of the command. Unlike **BASIC**, the quotes and device designation are optional so that **E MYPROG** is the same as **ENTER "D: MYPROG"** (or **ENTER"D: MYPROG** for **ASM/ED** users).

These commands are handy when using wildcards to manipulate more than one file: **LOCK ****. Keep in mind that with the exception of **FORMAT**, there is no safety prompt with these commands. If you type **DEL.MYFILE**, **MYFILE** will be deleted.

The **RENAME** command will not permit you to use the same name as an existing file (you know what havoc that causes!). The **BLOAD** command will recognize the **/N** suffix (even in the **.C** form, like **.B10/N**) to bypass the initialization and run steps in the binary load process.

The **MOVE** command functions like the Duplicate File option in the **DOS** menu. The file is copied into memory, then the system pauses and the message **INSERT DISK2;**



Supercharger for Atari DOS

by DR. BERNARD E. OPPENHIEM

continued on next page

HIT ANY KEY (S=SCREEN) is displayed. If you type [S], the file will scroll up the screen. The scrolling can be halted and resumed by entering [CTRL] [I]. If you hit any other key the file is written back to the disk under the original file name. The only limitation here is that the file must fit into the available free RAM, or else the message "OUT OF RAM" will appear and the operation will be terminated. For 48K systems a file up to 233 sectors long can be moved when there is no program in memory.

To use DUPSYS (via the DOS command) you must first remove DISKIO by typing KILL [RETURN]. To restore DISKIO the system must be rebooted. If the system is booted with no cartridge, DISKIO will return control to DOS and the DUPSYS menu will appear. It should be noted that all DISKIO commands are active only at the READY level to keep DISKIO from interfering with user programs (think what trouble the KILL command would cause in an adventure game).

TWO DISK DRIVES

All DISKIO commands can be used with two disk drives. The command DIRn will display the directory for Drive n, for n=1, 2, 3, or 4. Furthermore, this command causes Drive n to become the default drive for all situations in which the drive number is not specified. For example, upon typing DIR2 [RETURN] the directory for Drive 2 is displayed, and a subsequent .C command will refer to

files on that drive. FORMAT will format the disk in Drive 2 and WDOS will write DOS.SYS to it.

When using the MOVE command with two drives, only the files in drive 1 can be copied to the screen, and drive 1 files can only be moved to drive 1. However, when the directory for drive 2 is displayed, the MOVE command will automatically copy the designated file into memory, then immediately move it to drive 1 under the original file name.

FOR ADVANCED USERS

DISKIO is located between \$1CFC and \$2934, and protects itself by moving up MEMLO. It reverts the screen editor's GET BYTE routine, allowing it to compare all entries with a list of commands in a jump table. If a match is found the appropriate command is executed. Otherwise the entry is returned to the screen editor. DISKIO reinitializes itself upon [RESET].

DISKIO should not conflict with the user's program unless the latter overwrites DISKIO's reserved memory or moves MEMLO into it. All permanent storage is within the reserved memory, and LBUFF is used for temporary storage. Page One is used only for stack functions and page Six is not used. Page Zero is not altered since existing values are saved in the stack upon entering DISKIO and restored upon exiting.

The DISKIO AUTORUN.SYS file can be concatenated with other AUTORUN.SYS files which do not conflict with it. DISKIO should probably be the first segment in the chain to make it reset-proof.

For users with the Omnimon chip, the MOVE command can be used to modify disk files in Drive 1. After copying the file into memory the system pauses to allow the user to change disks. At this point Omnimon can be invoked, the file can be modified in memory, and then can be written back to disk with these keystrokes: [START] [RETURN] to exit Omnimon, [RETURN] to write the file back to disk, and [RESET] to restore some vectors.

Bernard E. Oppenheim is a nuclear medicine physician in Indianapolis. He has been programming in FORTRAN on large computers for 15 years and began programming the Atari in assembler two years ago. Dr. Oppenheim has contributed DISKIO to the public domain as of February, 1985 and Antic is pleased to introduce this important utility to the Atari users community.



Listing on page 62

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by EARL RICE

Until now, the Parallel Bus Interface has been one of the big mysteries of Atari XL computers. This important Antic series—by one of Atari's former top technical executives—will at last provide all the information necessary for tapping the power of this 100,000 byte per second connection.

If you own an Atari 600XL or 800XL, you've probably noticed a little plastic cover on the back. Above that cover are the words "PARALLEL BUS." Until now, this port has only been used for memory expansion cartridges.

Then last June at the Consumer Electronics Show, the Atari company finally released full specifications for the Parallel Bus Interface (PBI). This series of articles is based on that information.

In the next few issues of *Antic*, we'll explain how the parallel bus works and how you can use it with your own projects.

IMPORTANCE OF THE PBI

The parallel bus interface runs at the same speed as the 6502 microprocessor—and it can transfer information more than 40 times faster than the serial connector.

The serial connector can transfer no more than 2400 bytes per second. The parallel bus can easily transfer 100,000 bytes or more per second, depending on software execution speed. This speed allows you to design controllers for hard disks and other high-speed devices.

WHAT THE PBI IS

Basically, the parallel bus connector is an extension of the 6502 data, address, and control signals. These signals aren't buffered, and can drive only a very limited electrical load. Unmodified, there isn't very much you can do with the PBI. When used with

appropriate software and hardware, however, the PBI becomes an extremely powerful extension of your computer.

Fortunately, the PBI's design is easy to understand. Additionally, most of the software you'll need is already in the Operating System. This code, called the Generic Parallel Device Handler, resides at location 58511 (\$E4BF), just waiting to talk to your high-speed devices. All you have to do is write the low-level hardware driver software and combine it with your hardware.

But first you need to see how the PBI works.

A parallel device (Figure 1) is essentially a circuit board containing five key elements:

- A ROM chip containing both the low-level driver software and a Device Handler Table.
- Any RAM required for on-board buffers.
- Some address-decoding logic.
- A hardware-select register.
- The functional circuitry itself. (Perhaps an I/O device such as a universal asynchronous receiver/transmitter (UART) to drive a modem, or a parallel interface adapter (PIA) to drive a printer.)

All device registers, ROM, and RAM are mapped into your computer's memory space as shown in the simplified memory map (Figure 2).

The PBI's ROM space is mapped into the same area as the OS conversion routines from ASCII to Floating Point. The computer's memory management IC switches out the OS ROM when an external device is selected, and switches back in when it's done. The catch is that your external device can't use the floating point software in the OS. It also can't use any function of the OS or application software

continued on next page

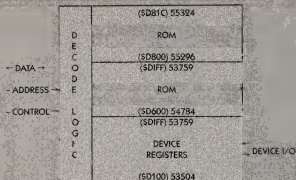


Figure 1

Parallel Device Block Diagram

(like BASIC) that uses floating point routines.

Since most external devices are essentially I/O peripherals, these restrictions should not create many programming problems.

The first 26 bytes of ROM contain a data table (Figure 3). This is a handler table which has the same format as the other OS vector tables. Note that some of the data is optional. The required data consists of ID bytes used by the Generic Handler to validate the presence of a parallel device, and JUMP vectors to device functions.

During a coldstart, just before at-

tempting to initialize a cartridge, the OS will poll for parallel devices. If the ID bytes are correct, the OS will execute the JMP to the INIT routine at 55321 (\$D819) through 55323 (\$D81B). This routine must put the address of the Generic Handler (58511, or \$E48F) into the OS handler table (HATABS) along with the device name (T, for example).

That done, your routine sets its select bit in the Device Mask, performs any device-specific initializations and ends with an RTS instruction.

That's really all it takes to let the OS "talk" to your device. Of course, there

are the low-level device drivers to consider, but we'll examine them in a later article. For now, remember that the OS simply needs to know that your device exists (have its bit set in the Device Mask) and to have the Generic Handler's address in HATABS (Figure 4).

The OS can handle up to eight devices on the PBI. The OS selects a device by setting the appropriate bit in the Hardware Select register, located at 53759 (\$D1FF). BIT 0 selects DEVICE 0, BIT 1 selects DEVICE 1, and so on.

Just like the other registers in the computer, this one has a shadow loca-

	ADDRESS	OS	DEVICE
58511	\$E48F	GENERIC HANDLER	
55324	\$D81C	FLOATING POINT ROUTINES	9K ROM
55296	\$D800		
55295	\$D7FF		
54784	\$D600		RAM
53759	\$D1FF		SELECT REGISTER
53758	\$D1FE		DEVICE REGISTERS
53504	\$D100		
584	\$0248	SELECT SHADOW	
583	\$0247	DEVICE MASK	

Figure 2

Parallel Device Memory Map

\$D800 *ROM CHECK SUM LOW BYTE	\$D80A INTERRUPT VECTOR HIGH BYTE	\$D814 PUT BYTE VECTOR HIGH BYTE
\$D801 *ROM CHECK SUM HIGH BYTE	\$D80B ID NUMBER (\$91)	\$D815 STATUS VECTOR LOW BYTE -1
\$D802 *ROM REVISION NUMBER	\$D80C *DEVICE NAME (ASCII)	\$D816 STATUS VECTOR HIGH BYTE
\$D803 ID NUMBER (\$80)	\$D80D OPEN VECTOR LOW BYTE -1	\$D817 SPECIAL VECTOR LOW BYTE -1
\$D804 *DEVICE TYPE	\$D80E OPEN VECTOR HIGH BYTE	\$D818 SPECIAL VECTOR HIGH BYTE
\$D805 JMP (\$4C)	\$D80F CLOSE VECTOR LOW BYTE -1	\$D819 JMP (\$4C)
\$D806 I/O VECTOR LOW BYTE	\$D810 CLOSE VECTOR HIGH BYTE	\$D81A INIT VECTOR LOW BYTE
\$D807 I/O VECTOR HIGH BYTE	\$D811 GET BYTE VECTOR LOW BYTE -1	\$D81B INIT VECTOR HIGH BYTE
\$D808 JMP (\$4C)	\$D812 GET BYTE VECTOR HIGH BYTE	\$D81C *UNUSED
\$D809 INTERRUPT VECTOR LOW BYTE	\$D813 PUT BYTE VECTOR LOW BYTE -1	

*OPTIONAL — NOT REQUIRED

Figure 3

ROM Vector Table

tion. The computer uses shadow registers to update the values in its hardware registers. These values are updated 30 times per second. The Hardware Select register's shadow location is at \$83 (\$0247).

SELECTING DEVICES

Before selecting a device, the OS looks at the Device Mask (location \$83, \$0247) to see if such a device really exists. Recall that this was the bit set by the initialization routine.

Parameters are passed between the OS and the device using the A, X and Y registers plus the Page Zero IO Control Block (IOCB).

The carry flag tells the OS whether or not the device performed its requested function. The device sets the flag when it has performed its function. Otherwise, the carry flag is left RESET (0).

The A register passes a data byte, the X register contains the index to the originating device's IOCB, and the Y register contains a Device Status byte. This is the same as any other Central I/O (CIO) operation.

By the way, this is a good place to mention that Atari's Technical Reference Notes (C016555 Rev. A) are worth their weight in system errors. The basic operation of CIO, IOCB's, Device Status codes and the like are all presented concisely. If you are

continued on page 75

```

$031A 'P' (PRINTER NAME)
$031B HANDLER LOW BYTE
$031C HANDLER HIGH BYTE
$031D 'C' (CASSETTE NAME)
$031E HANDLER LOW BYTE
$031F HANDLER HIGH BYTE
$0320 'E' (EDITOR NAME)
$0321 HANDLER LOW BYTE
$0322 HANDLER HIGH BYTE
$0323 'S' (SCREEN NAME)
$0324 HANDLER LOW BYTE
$0325 HANDLER HIGH BYTE
$0326 'K' (KEYBOARD NAME)
$0327 HANDLER LOW BYTE
$0328 HANDLER HIGH BYTE
$0329 0 (T)
$032A 0 ($8F)
$032B 0 ($E4)
$032C 0 (NAME SLOT)
$032D 0 (VECTOR LOW SLOT)
$032E 0 (VECTOR HIGH SLOT)
$032F 0
$0330 0
$0331 0
$0332 0
$0333 0
$0334 0
$0335 0
$0336 0
$0337 0
$0338 0
$0339 0
$033A 0
$033B 0 (ALWAYS 0)

```

FIND THE FIRST
0 NAME ENTRY, THEN:
PUT DEVICE NAME HERE
PUT GENERIC HANDLER ADDRESS
(\$E48F) HERE

Figure 4

Putting Your Device In HATABS

Say goodbye to glitchy DOS 3 forever! Convert your files back to good old DOS 2.05. You'll need three blank disks and your DOS 3 Master Disk. You'll also need the BASIC version of Eric Verbeiden's SEQDOS program from "Cassette Lookalike—Hour Disk Drive" on page 81 of the July, 1984 Antic.

ESCAPE FROM DOS3

Your files will thank you

by CHARLES JACKSON
Antic Staff Writer

Many Atari programmers were bitterly disappointed when they tried Atari's newest disk operating system last year. DOS 3 turned out to be flawed, slow and user-hostile.

Users had to correct the original DOS 3 versions with several obscure POKE statements from BASIC. All versions of DOS 3 store your programs in a format that is incompatible with virtually every other disk operating system. DOS 3 keeps each utility in a separate file. These utilities must be individually loaded or copied from the DOS 3 Master Disk before you can use them.

The final blow is that DOS 3 does not allow you to re-convert your programs back into DOS 2.05 after you converted them to DOS 3. Your only choice was retyping the whole program listing to SAVE on a DOS 2 disk... until today! continued on page 50

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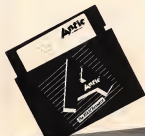
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PREPARING THE SEQDOS DISKS:

1. Using the SEQDOS.BAS program, prepare one SEQDOS disk with DOS 2 files, and one SEQDOS disk without DOS 2 files. (See Verheiden's article for instructions.)
2. Boot your DOS 3 Master Disk. Initialize the remaining disk with option "I." (Remember to type Y to write the FMS.SYS file.) You should also copy the KCP.SYS, KCPOVER.SYS and CONVERT.UTL files from your Master Disk to this disk.
3. Return to the DOS 3 menu and use the "A" option to convert your SEQDOS BAS program (the one you just typed in) to DOS 3.

4. RUN the converted SEQDOS.BAS program. The computer will print:

"PRESS RETURN TO FORMAT?"

Then press the [BREAK] key and type DOS.

5. When the menu appears, type [S]. Then, type:

```
AUTORUN.SYS [RETURN]
600 [RETURN]
6FF [RETURN]
609 [RETURN]
[RETURN]
```

The computer will print:

AUTORUN.SYS SAVED

This is your SEQDOS + DOS 3 disk. Remove it and put a write-protect tab on it.

At this point, you should have three disks: A SEQDOS disk, a SEQDOS + DOS 2 disk, and a SEQDOS + DOS 3 disk. You're now ready to convert any BASIC program from DOS 3 to DOS 2.

USING THE SEQDOS DISKS:

1. Boot the SEQDOS + DOS 3 disk, then insert the disk containing the program to be converted. LOAD (or ENTER) your program.
2. Insert your SEQDOS disk and type CSAVE [RETURN].
3. Boot your SEQDOS + DOS 2 disk then insert your SEQDOS disk. Type CLOAD [RETURN].
4. Your converted program is now in the computer's memory. It can be SAVED or LISTed to any DOS 2 disk.



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TECH TIPS	64

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Antic Listing Credits, Gemini 10X Printer—\$399 from Star Micronics, Inc., 200 Park Avenue, New York, N.Y. 10166 Lister Plus Software—\$19.95 from Non-Standard Magic, PO. Box 45, Girard, Ohio, 44420. (48K disk)

How To Use TYPO II

Type in TYPO II and SAVE a copy to disk or cassette.

Type GOTO 32000 and follow TYPO II onscreen instructions. If the resulting two-letter line codes are not exactly the same as those in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME", 0, 31999 (Cassette owners LIST "C:"). Type NEW, then ENTER "D:FILENAME" (Cassette—ENTER "C:"). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

BASIC XL cartridge owners type SET 5.0 and SET 12.0 before using TYPO II.

```

40 32000 REM TYPO II BY ANDY BARTON
41 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
45 32020 CLR :DIM LINES(120):CLOSE #2:CLS
50 32030 OPEN #2:4.0,"E":OPEN #3:5.0,"E"
60 32040 ? "S":POSITION 11.1:?"*****"
70 32050 TRAP 32040:POSITION 2.3:?"Type
  in a program line"
85 32060 POSITION 1.4:?" ":INPUT #2:LINE
  5:IF LINES="" THEN POSITION 2.4:LIST 0
  :GOTO 32060
90 32070 IF LINES(1,1)="" THEN 0=VAL(LIN
  ES(2,LEN(LINES)):POSITION 2.4:LIST 0:
  GOTO 32060
10 32080 POSITION 2.10:?"CONT"
11 32090 0=VAL(LINES):POSITION 1.3:?" ":
12 32100 POKE 042,15:STOP
13 32110 POKE 042,12
14 32120 ? "S":POSITION 11.1:?"*****"
  :POSITION 2.15:LIST 0
15 32130 C=0:ANS=C
16 32140 POSITION 2.16:INPUT #3:LINE:IF
  LINES="" THEN ? "LINE ":0:" DELETED":G
  OTO 32050
17 32150 FOR 0=1 TO LEN(LINES):C=C+1:ANS=
  ANS+(C*ASC(LINES(0,0))):NEXT 0
18 32160 CODE=INT(ANS/676)
19 32170 CODE=ANS-(CODE*676)
20 32180 HCODE=INT(CODE/26)
21 32190 LCODE=CODE-(HCODE*26)+65
22 32200 HCODE=HCODE+65
23 32210 POSITION 0.16:?" CHR$(HCODE):CHR$
  (LCODE)
24 32220 POSITION 2.13:?"If CODE does no
  t match Press [REVERSE] and edit line a
  bove.":GOTO 32050
  
```



Sometimes it's not easy to tell apart the following characters, shown here in both normal and inverse video. Be especially careful when you type any of these:


















































































✓ ✗ CTRL F	✓ ✗ /
✓ ✗ CTRL G	✓ ✗ SHIFT +
✓ ✗ CTRL N	✓ ✗ SHIFT -
✓ ✗ CTRL R	✓ ✗ -
✓ ✗ CTRL S	✓ ✗ +

Typing Special Atari Characters

Shown below are the Atari Special Characters as printed in Antic listings—and the keys you must type in order to get them.

Whenever the CTRL key (CONTROL on XL models) or SHIFT key is used, *hold it down* while you press the next keys. Whenever the ESC key is used, *press and release* it before typing the next keys.

Turn on inverse video by pressing the Atari logo key  once. Turn it off by pressing a second time. (XL models use the Reverse Video Mode Key  instead.)

NORMAL VIDEO		INVERSE VIDEO	
FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		A CTRL ,
	CTRL A		A CTRL A
	CTRL B		A CTRL B
	CTRL C		A CTRL C
	CTRL D		A CTRL D
	CTRL E		A CTRL E
	CTRL F		A CTRL F
	CTRL G		A CTRL G
	CTRL H		A CTRL H
	CTRL I		A CTRL I
	CTRL J		A CTRL J
	CTRL K		A CTRL K
	CTRL L		A CTRL L
	CTRL M		A CTRL M
	CTRL N		A CTRL N
	CTRL O		A CTRL O
	CTRL P		A CTRL P
	CTRL Q		A CTRL Q
	CTRL R		A CTRL R
	CTRL S		A CTRL S
	CTRL T		A CTRL T
	CTRL U		A CTRL U
	CTRL V		A CTRL V
	CTRL W		A CTRL W
	CTRL X		A CTRL X
	CTRL Y		A CTRL Y
	CTRL Z		A CTRL Z
	ESC ESC		ESC
	ESC CTRL -		SHIFT INSERT
	ESC CTRL =		ESC
	ESC CTRL +		CTRL TAB
	ESC CTRL *		ESC
	CTRL ,		SHIFT SHIFT
	CTRL /		TAB
	SHIFT -		A CTRL ,
	ESC		A CTRL /
	SHIFT CLEAR		A SHIFT -
	ESC DELETE		ESC CTRL 2
	ESC TAB		ESC
			CTRL DELETE
			ESC
			CTRL INSERT

Boxes are drawn around the normal video characters here so you can see their positions more accurately; these boxes do not appear in the printed listings.

BASIC SEARCHER

Article on page 17.

LISTING 1

```

OC 31900 REM SEARCH UTILITY
OC 31901 REM BY SCOTT SHECK
GN 31902 REM ANTIC MAGAZINE
FR 31903 GOSUB 31907:POKE 4,1:POKE 2,PEEK
(136):POKE 3,PEEK(137)
OL 31904 ZZ=USR(1536):IF PEEK(4)=0 THEN 3
1925
JF 31905 A=PEEK(0)+PEEK(1)*256:IF N=10 TH
EN LIST "P",A:GOTO 31904
GN 31906 LIST A:GOTO 31904
AM 31907 RESTORE 31900:GRAPHICS 0:IF PEEK
(1537)<216 THEN FOR N=1536 TO 1630:RE
AD A:POKE N,A:NEXT N
NG 31908 DATA 104,216,160,0,177,2,133,0,2
00,177,2,133,1,201,124,200,11,165,0,20
1,156,200,5,160,0
RP 31909 DATA 132,4,96,200,177,2,133,204,
200,200,177,2,197,203,200,4,32,91,6,96
,201,0,240,35,201,1
CK 31910 DATA 240,31,201,14,200,4,169,7,2
00,7,201,15,200,11,200,177,2,132,206,2
4,101,206,160,177,2,201,20
YU 31911 DATA 240,209,201,22,200,206,32,9
1,6,76,2,6,0
OH 31912 DATA 165,2,24,101,204,133,2,144,
2,230,3,96
SJ 31913 ? : ? , "SEARCH UTILITY":POKE 02,0
:COUNT=120:ZZ=PEEK(130)+PEEK(131)*256:
? : ? COUNT:" "
MN 31914 A=PEEK(ZZ):? CHR$(A-120*(A)=120)
):IF A<120 THEN 31919
VI 31915 COUNT=COUNT+1:IF PEEK(ZZ+1)=90 A
ND PEEK(ZZ+2)=210 THEN 31920
TZ 31916 IF COUNT=140 THEN POKE 02,14:P05
ITION 14,2
KU 31917 IF COUNT=160 THEN POKE 02,20:P05
ITION 20,2
AH 31918 ? : ? COUNT:" "
YH 31919 ZZ=ZZ+1:GOTO 31914
MR 31920 POKE 02,2:POSITION 2,23: ? : ? "NU
MBER":INPUT A:POKE 203,A: ? "SCREEN OR
PRINTER":
IK 31921 N=PEEK(764):IF N<10 AND N<62 T
HEN 31921
JJ 31922 ? "N":RETURN
MF 31923 ? "M": ? :FOR ZZ=31900 TO 31914: ?
ZZ:NEXT ZZ: ? "CLR:POKE042,12:CONT": ? P
OSITION 2,0:POKE 042,13:STOP
00 31924 ? "M": ? :FOR ZZ=31915 TO 31920: ?
ZZ:NEXT ZZ: ? "CLR:POKE042,12:CHR$(12
5)": ? POSITION 2,0:POKE 042,13:END
TO 31925 ? : ? "END OF SEARCH": ? : ? "AGAI
N (Y/N) ?":POKE 764,255
KZ 31926 IF PEEK(764)=43 THEN POKE 764,25
5:GOTO 31900
V0 31927 IF PEEK(764)=35 THEN POKE 764,25
5:GOTO 31923
JK 31928 GOTO 31926

```

ERROR FILE

OCTOBER
OMISSIONS
October '84

A number of division signs (/) were omitted at the printer. On the magazine pages there is an empty space where they should have appeared. Here are the specific corrections:

MOLE ATTACK

Page 53
Line 20: POKE 756,S/256

Page 54
Line 1060: T=18-L/2

Page 55
Lines 1090 and 1110:
PEEK (20)/0(60)
Line 1140: 756,S/256

Line 1160:
IF AB/2<INT (AB/2)
Line 1170: AC=1 TO AB/2
Line 1330: 756,S/256

PLUS MINUS

Page 56
Line 469:
SOUND 0,40,10,N/4
Line 9020: CHBASE/256
Page 57
Line 10014:0*,/1

BOUNCING BALL

Page 57
Line 110: INT(X/256)

ANTIC 4/5
ANIMATOR/
EDITOR

Page 59
Line 84: A N T I C 4/5
Page 63—in an unrelated error, the following two lines were left out of listing 3:

```

2820 FOR J=1 TO 10:
      FOR I=0 TO 8
2822 K=USR(COPY
      ,8,(10+I),AW)

```

Page 66
"HYPNO,BAS"
Line 210: ADDRESS/256)

Line 220: (BYTES/256)

"DEMO"

Line 10: ERASE/PRINT

DIVER

Page 69
Line 550: *6:"?"
Line 630: 0)*20)/(SK+1
Line 650: *200)/(SK+1)
Line 670: *15)/(SK+1)

continued on next page

Q.T.

Article on page 30.

LISTING 1

```

PT 1 REM Q.T. BY BRIAN MCWILLIAMS
NC 2 REM ANTIC MAGAZINE JUNE 1984
NH 10 DIM MOVES(32),A5(5):LIVES=3:OFF=729
0:C1=1:G0S00 10000
TE 20 FOR H=C1 TO PEEK(1699):A5(H,H)=STR$
(PEEK(1699+H)):NEXT H:HI=VAL(A5)
IK 50 COLOR 61:PLOT 0,C1:ORAWTO 19,C1:PLOT
1 0,21:ORAWTO 19,21
GM 55 PLOT 2,5:ORAWTO 17,5:ORAWTO 17,9:OR
AWTO 2,9:ORAWTO 2,5
HF 60 COLOR 162:PLOT 0,2:ORAWTO 0,20:PLOT
19,2:ORAWTO 19,20:COLOR 34:PLOT 4,2:O
RAWTO 4,4:PLOT 15,2:ORAWTO 15,4
EG 70 COLOR 47:PLOT 4,11:ORAWTO 0,11:ORAW
TO 0,15:ORAWTO 4,15:ORAWTO 4,11:PLOT 1
1,11:ORAWTO 15,11:PLOT 13,12
LV 80 ORAWTO 13,15:PLOT 7,14:PLOT 9,16:CO
LOR 175
HY 85 PLOT 11,15:PLOT 15,15:POSITION 3,6:
? M6:"ANTIC MAGAZINE":POSITION 6,0
KD 90 ? M6:"PRESENTS":POSITION 3,10: ? M6:
"Programmed by":POSITION 2,20: ? M6:"O
RIAN MCWILLIAMS"
GJ 100 G0S00 7000:0R0=0R0+(0R0<3)-2*(0R0=
3):0IC=BIC*(0R0=C1):Z=50*0IC:POSITION
C1,Z: ? M6:"TOP ":HI
IO 105 IF 0IC=7 THEN 1000
YH 125 0I=72*(0IC=C1)+74*(0IC=2)+75*(0IC=
5)+50*(0IC=4)+06*(0IC=5)+01*(0IC=6):G0
500 7020:IF 0R0=C1 THEN G0S00 1640
NM 150 G0S00 7020:COLOR 61:PLOT 0,C1:ORAW
TO 19,C1:ORAWTO 19,22:ORAWTO 0,22:ORAW
TO 0,C1
OB 140 G0S00 7100:G0S00 7110:TIME=750-(0I
C=50):INT=10*5*0IC:G0S00 7130
SG 150 ON 0R0 G0S00 200,000,1050
LS 160 GOTO 100
RJ 200 COLOR 47:FOR H=C1 TO 75+10*MIC
OG 210 A=INT(10*0R0(0))+C1:0=INT(20*0R0(0
))+2:LOCATE A,0:C:IF C<32 THEN 210
GA 220 PLOT A,0:NEXT H:FOR H=C1 TO 4
FK 240 A=INT(16*0R0(0))+2:0=INT(10*0R0(0
))+3:LOCATE A,0:C:IF C>36 AND C<41 OR A
=9 AND 0=9 THEN 240
HV 250 COLOR 36+X:PLOT A,B:NEXT X:BC=42:H
P=9:YP=10:G0S00 7065
GH 300 IF NOT STRIG(0) THEN G0S00 460
KL 310 A=STICK(0):A=(A=14 OR A=10 OR A=6)
+2*(A=7)+3*(A=13 OR A=9 OR A=5)+4*(A=1
1):ON A G0S00 350,420,410,440
V0 320 LOCATE C1,2,UL:LOCATE 10,2,UR:LOCA
TE 10,21,LR:LOCATE C1,21,LL:IF UL=37 A
NO UR=30 AND LR=39 AND LL=40 THEN 600
HW 340 G0S00 7500:POKE 77,0:GOTO 300
OP 350 Y=C1:H=0
G5 360 LOCATE HP+X,YP+Y,C:IF C=32 THEN G0
500 7030:RETURN
PH 370 IF C=47 THEN G0S00 7090:G0S00 7030
:RETURN
LD 380 IF NOT H THEN IF C>36 AND C<41 OR
C=DI THEN 400
ZR 390 RETURN
KK 400 LOCATE HP+H*2,YP+Y*2,CC:IF CC=32 T
HEN G0S00 7040:G0S00 7030
ZP 405 RETURN
G0 410 Y=C1:H=0:GOTO 360
00 420 IF 0C=43 THEN 0C=42:Y=0:H=0:G0S00
7030:RETURN
0M 430 Y=0:H=C1:GOTO 360
PF 440 IF 0C=42 THEN 0C=43:Y=0:H=0:G0S00
7030:RETURN
UN 450 Y=0:H=C1:GOTO 360
JC 460 C=44*(0C=42)+95*(0C=43):COLOR C:PL
OT HP,YP

```

ERROR FILE

EXPLORING
THE XL

June '84

There was a misprinted inverse video zero. In line 230, what appears as inverse "Or" should instead read "0r", replacing the capital letter with a zero.

RECALL

August '84

To get this program to run, you must first 'LIST' it to disk or cassette, type 'NEW' then

type: DIM QQ\$(1). After this, 'ENTER' the program and it should run, 'SAVE' this version which will run from then on without the preliminaries.

CREEPY CAVERNS

August '84

In line 10, change MO(N,5) to MO(P,5). In line 349, there is a YO(YZERO) that should be YO (Y0). The first change will prevent an error 3 and the second an error 9.

SPACED-OUT
NUMBERS

July '84

For non-XL machines, change line 31040 as follows:
31040 D=INT (VAL(C\$)/
INT(100A(68-B0))
+1.0E-03)).

MATCHBOX
TIC-TAC-TOE

April '84

Change line 2078 to: 2078
CLOSE #3:RETURN

UPDATE DISKS
WITH NOTE
AND POINT

April '84

Line 160 should read GOTO 600. Lines 410, 440, 470, 500 and 530 should all begin: INLEN=LEN(USERS\$).

MATH WIZARD

April '84

The 17th string character in line 50 should be an inverse zero. This will generate the proper Typo table.

```

LD 465 FOR K=B5 TO 45 STEP -1: SOUND 0,X,
10,10: NEXT X: GOSUB OFF
UY 470 GOSUB 7065: LOCATE KP-(BC+43)+(BC+4
2),YP,C: IF C=32 OR C=61 THEN RETURN
IO 498 IF BC=42 THEN EN20
LK 580 FOR K=KP-C1 TO C1 STEP -1: LOCATE
K-C1,YP,C: IF CC<32 THEN GOSUB OFF: RE
TURN
EY 510 SOUND 0,114-X,18,12: COLOR 32: PLOT
M,YP: COLOR C: PLOT X-C1,YP: NEXT X: GOSUB
OFF: RETURN
KV 520 FOR K=KP+C1 TO 18: LOCATE K+C1,YP,C
C: IF CC<32 THEN GOSUB OFF: RETURN
ZK 538 SOUND 0,114+X,18,12: COLOR 32: PLOT
X,YP: COLOR C: PLOT X+C1,YP: NEXT X: GOSUB
OFF: RETURN
JN 600 GOSUB 7150: FOR K=2 TO 21: LOCATE C1
,X,C: IF C=32 OR C=42 OR C=43 THEN EN20
JT 610 POSITION C1,X: GOSUB 640
PR 620 LOCATE 18,X,C: IF C=32 OR C=42 OR C
=43 THEN EN20
NM 638 POSITION 18,X: GOSUB 640: GOTO 650
UC 640 Y=6: CHR$(81+120): GOSUB 7180: RETUR
N
LM 658 NEXT X: SCORE=SCORE+BONUS+TIME: GOSUB
OFF: RETURN
ON 680 COLOR 32: PLOT 0,2: PLOT 0,3: PLOT 19
,2: PLOT 19,3: PLOT 4,22: DRAHTO 15,22: CO
LOR 61: PLOT 0,4: DRAHTO 2,4: PLOT 19,4
RN 618 DRAHTO 17,4: PLOT 3,21: PLOT 16,21: P
LOT 3,20: DRAHTO 16,20: COLOR 34: PLOT C1
,2: PLOT C1,3
VI 628 PLOT 18,21: PLOT 18,3: PLOT 0,5: DRAHTO
0,21: PLOT 2,5: DRAHTO 2,21: PLOT 19,5:
DRAHTO 19,21: PLOT 17,5: DRAHTO 17,21
GA 638 COLOR 93: PLOT 2,3: COLOR 01+120: PLO
T 17,3: NM=5: NX=NM
MU 658 KP=9: YP=19: BC=42: GOSUB 7065
NB 668 FOR KK=C1 TO 11-BIC: A=STICK(0): A=(
A+1 AND A<0)+2*(A>0 AND A<12)
RB 665 COLOR 62: PLOT 2,NM: ON A GOSUB 420,
440: GOTO 675
OC 670 FOR A=C1 TO 10: NEXT A
YH 675 COLOR 93: PLOT 2,NM: NEXT KK
OH 680 A=INT(4*RN0(0))+C1: IC=64*(A+1)+47*(
A+2)+35*(A+3)+01*(A+4): IP=INT(14*RN0(
0))+3
CV 685 IV=2*(IC=01)+50*(IC=64 OR IC=47)
ZM 690 FR=IC=64 OR IC=50 OR IC=72 OR IC=
74)+2*(IC=75 OR IC=47)+3*(IC=35 OR IC=
06 OR IC=01)
GC 695 A=INT(2*RN0(0))+C1: IC=IC+120*(A=2)
FF 900 FOR K=2 TO 10 STEP FR: COLOR IC: PL
OT IP,KK: A=STICK(0): A=(A+4 AND A<0)+2*(
A>0 AND A<12)
VH 905 IF NOT A THEN FOR K=C1 TO 10: NEXT
K
KS 907 ON A GOSUB 420,440: COLOR 32: PLOT I
P,KK
HS 910 SOUND C1,57+KK,10,9: NEXT KK: SOUND
C1,0,0: LOCATE IP,19,C: IF C<32 THEN
IF IC=163 OR IC=35 THEN EN20
OG 920 COLOR IC: PLOT IP,10+IC=32: FOR K=C
1 TO 5: NEXT K: K=IP-KP: Y=IC=32: GOSUB
7090: COLOR 32: PLOT KP+K,YP+Y
HJ 925 IF IC=163 OR IC=35 THEN 060
MS 930 IF C=32 THEN 1000
VV 940 COLOR 32: PLOT 17,NK: POSITION 17,NK
+C1+7: M6: CHR$(81+120): CHR$(34): "" : COL
OR 61: PLOT 17,NK+2: DRAHTO 19,NK+2
JO 950 NK=KK+C1: GOSUB 7170: GOSUB OFF: SCOR
E=SCORE+IV
SH 960 GOSUB 7100: IF NK<19 THEN 060
MI 970 K=C1: V=0: FOR KK=KP TO 17: GOSUB 420
: NEXT KK: GOSUB 7150: FOR KK=NM TO 10: GO
SUB 7160: GOSUB 7100: NEXT KK
VS 900 SCORE=SCORE+BONUS: RETURN
RM 990 GOTO 060

```

```

UZ 1000 GOSUB 7160: IF NK<19 THEN 060
IM 1020 FOR K=2 TO KP: COLOR 62: PLOT K,19:
FOR Y=C1 TO 5: SOUND 0,157-X,10,10: NEXT
Y: COLOR 93: PLOT K,19: GOSUB OFF
MY 1030 FOR Y=C1 TO 5: NEXT Y: COLOR 32: PLO
T X,YP: NEXT K: GOSUB OFF: GOTO 7190
NE 1058 COLOR 32: PLOT C1,22: DRAHTO 18,22:
COLOR 61: PLOT C1,4: DRAHTO 4,4: PLOT 15,
4: DRAHTO 10,4
VE 1070 KP=4: YP=3: BC=42: GOSUB 7065
LB 1080 IF BLL THEN 1100
SO 1090 FOR KK=C1 TO 11-BIC
KV 1095 IF NOT MI THEN RETURN
OI 1100 POKE 77,0: GOSUB 7100: IF NOT STRI
G(0) THEN 1500
ZF 1105 FOR A=C1 TO 25: NEXT A
EN 1110 B=STICK(0): A=(0+4 AND B<8 AND BC<
9)+2*(B<8 AND B<12 AND BC<9)+3*(B>
4 AND B<8 AND BC=92)
AK 1120 A=A+4*(B>8 AND B<12 AND BC=92): ON
A GOSUB 420,440,1550,1530: GOTO 1140
YC 1130 FOR A=C1 TO 15: NEXT A
CA 1140 LOCATE KP,YP+C1,C: IF C=32 AND BC<
92 THEN BC=92: GOSUB 7065
VG 1150 IF C=61 AND BC=92 THEN BC=42*(NPK
5)+43*(NPK14): GOSUB 7065
LU 1160 IF C=33 OR C=161 THEN C=92: GOTO 1
320
VO 1170 IF BC=92 AND YP=22 THEN 1600
OG 1180 IF STRIG(0) AND BC=92 THEN COLOR
32: PLOT KP,YP: YP=YP+C1: GOSUB 7065
MS 1190 IF NOT BLL AND NK THEN NEXT NK: X
K=0
OC 1200 IF BLL THEN 1240
EF 1210 A=INT(3*RN0(0))+C1: IC=35*(A=C1)+6
3*(A=2)+01*(A=3): A=INT(2*RN0(0))+C1
EP 1220 BLL=35*(A=C1)+161*(A=2): IP=INT(10
*RN0(0))+C1: IV=10*(IC=35)+50*(IC=63)+2
*(IC=01)
ZA 1230 FR=(IC=35)+2*(IC=63 OR IC=75 OR I
C=74 OR IC=72)+3*(IC=50 OR IC=01 OR IC
=06): BLL=Y=20
NM 1235 A=INT(2*RN0(0))+C1: IC=IC+120*(A=2
)
IO 1240 FOR A=BLL+C1 TO BLL+FR STEP -C1
: LOCATE IP,A,C: IF C=32 THEN NEXT A
UB 1300 COLOR 32: PLOT IP,BLL: DRAHTO IP,B
LL+2: BLL=Y-A+C1: COLOR 01: PLOT IP,BLL
: COLOR 41: PLOT IP,BLL+C1: COLOR IC
EG 1310 PLOT IP,BLL+2: SOUND C1,150+01LL,
10,3: IF C=32 THEN 1000
OT 1320 COLOR 59: PLOT IP,BLL: FOR K=10 TO
0 STEP -C1: SOUND C1,56,0,X: NEXT K: SOU
ND C1,0,0: COLOR 32: PLOT IP,BLL
FA 1325 IF C=92 THEN SCORE=SCORE+IV
AF 1327 BLL=0: MI=MI-C1
MU 1330 COLOR 32: PLOT IP,BLL+C1: FOR A=0L
LY+3 TO 22: LOCATE IP,A,C: IF C=92 THEN
COLOR 32: PLOT IP,A-C: GOTO 1600
IM 1340 COLOR 32: PLOT IP,A-C1: COLOR IC: PL
OT IP,A: SOUND 0,124+A,10,12: NEXT A: SOU
ND 0,0,0,0
KV 1350 COLOR 32: PLOT IP,A-C1: GOTO 1090
VT 1500 BC=92: GOSUB 7065: FOR K=0 TO 10 ST
EP 2: SOUND 2,150,B,X: NEXT K: COLOR 36: P
LOT KP,YP: FOR K=10 TO 0 STEP -2
IX 1510 SOUND 2,150,B,X: NEXT K: LOCATE KP,
YP-C1,C: IF C=32 THEN COLOR C: PLOT KP,Y

```

continued on next page

```

P:YP=YP-C1:G0S0U 7065
KO 1520 SOUND 2.0,0.0:G0T0 1110
OA 1530 X=C1
OG 1535 LOCATE KP+K,YP:C1:IF C<>32 THEN X=
0
YK 1540 COLOR 32:PLOT KP,YP:XP=KP+K:G0S0U
7065:X=0:RETURN
OP 1550 X=C1:G0T0 1535
KO 1600 FOR X=0 TO 21:SOUND X,0.0,0:0:NEXT X
:COLOR 32:PLOT KP,YP
CN 1605 COLOR 61:PLOT 0,22:ORAWTO 10,22:C
OLOR 41:PLOT 0,21:PLOT 0,20:PLOT 10,21
:PLOT 10,20:COLOR 161:PLOT 0,19
YU 1610 PLOT 10,19:COLOR 45:PLOT 9,21:FOR
X=21 TO 15 STEP -C1:COLOR 32:PLOT 0,X
+C1:ORAWTO 10,X+C1
GF 1620 COLOR 61:PLOT 0,X:ORAWTO 10,X:COL
OR 45:PLOT 9,X-C1:COLOR 41:PLOT 0,X-2:
PLOT 10,X-2:COLOR 161:PLOT 0,X-3
XT 1630 PLOT 10,X-3:FOR Y=C1 TO 10:NEXT Y
:INEXT X:XP=9:YP=X:G0T0 7190
TO 1640 YP=13:0C=42
GC 1645 G0S0U 7020:COLOR 32:PLOT C1,22:OR
AWTO 10,22:COLOR 01
IZ 1647 PLOT 13+0IC,14:COLOR 42:YP=13:PL
T 5+0IC,YP:RESTORE 1700
MZ 1650 FOR NP=6+0IC TO 13+0IC:COLOR 32:P
LOT KP-C1,13:G0S0U 7065:READ A,0:1:SOUND
0,A,10,10:FOR N=C1 TO 0:NEXT N
AZ 1660 FOR M=10 TO 0 STEP -C1:SOUND 0,A,
10,M:NEXT M:NEXT KP:KP=KP-C1:FOR NX=C1
TO 9:G0S0U 410:NEXT NX
BO 1670 0C=92:FOR YP=21 TO 0 STEP -C1:COL
OR 32:PLOT KP,YP+C1:G0S0U 7065:READ A,
SOUND 0,A,10,10:FOR X=C1 TO 2:NEXT X
KZ 1680 COLOR 36:PLOT KP,YP:FOR X=10 TO 0
STEP -C1:SOUND 0,A,10,X:NEXT X:NEXT Y
P:RETURN
GX 1700 DATA 60,50,102,50,76,50,114,100,1
14,50,76,50,68,50,85,100
HO 1710 DATA 47,243,53,243,96,243,60,243,
53,243,47,243,60,243
ZH 1800 G0S0U 7020:COLOR 34:PLOT 6,C1:ORA
WTO 6,9:PLOT 13,C1:ORAWTO 13,9:COLOR 6
1:PLOT 5,10:ORAWTO 14,10
EZ 1810 ORAWTO 14,12:ORAWTO 5,12:ORAWTO 5
,10:POSITION 6,11:? M6:"you win":POS
ITION 2,15:? M6:"CONGRATULATIONS"
PS 1820 IF SCORE>HI THEN 7270
UZ 1830 G0T0 7280
LH 1840 CLR :END
OK 7000 POSITION 3,0:? M6:"PRESS TRIGGER
"
GS 7005 POKE 77,0:IF STRIG(0) THEN 7005
AT 7010 RETURN
GT 7020 COLOR 32:FOR X=0 TO 22:PLOT 0,X:0
RAWTO 19,X:NEXT X:RETURN
ON 7030 COLOR 32:PLOT KP,YP:XP=KP+K:YP=YP
+Y:G0S0U 7065:SOUND 0,57,10,10:G0S0U 0
FF:RETURN
TS 7040 COLOR 32:PLOT KP+K,YP+Y:COLOR C:P
LOT KP+K*2,YP+Y*2:SOUND 0,217,10,10:G0
SUB OFF:RETURN
GO 7065 COLOR 0C:PLOT KP,YP:RETURN
CV 7090 COLOR 59:PLOT KP+K,YP+Y:FOR A=C1
TO 2:SOUND 0,68,10,4:NEXT A:FOR A=C1 T
O 2:SOUND 0,85,10,4:NEXT A
IW 7095 G0S0U OFF:SCORE=SCORE+10*(0R0-C1)
:RETURN
PC 7100 POSITION 2,C1:? M6:SCORE:"":RETU
RN
YH 7110 COLOR 170:IF LIVES THEN FOR M=C1
TO LIVES:PLOT 14,M:C1:NEXT X:COLOR 61:
PLOT 14*LIVES+C1,C1:RETURN
EJ 7120 COLOR 61:PLOT 15,C1:ORAWTO 17,C1
:RETURN
ML 7150 IF 0R0=C1 THEN POSITION 9,C1:? M6
:TIME:""
AT 7140 RETURN
OK 7150 00NUS-0:POSITION 5,11:? M6:"bonus
X":2:RETURN
OU 7160 COLOR 32:PLOT 2,NM:POSITION 0,NM+
C1:? M6:"CHR5(34):"?:COLOR 61:PLOT
0,NM+2:ORAWTO 2,NM+2:NM=NM+C1
OF 7170 FOR X=C1 TO 2:SOUND 0,120,10,15:IN
EXT X:G0S0U OFF:RETURN
IN 7180 SOUND 0,X+124,10,10:00NUS=00NUS+2
:POSITION 0,13:? M6:00NUS:G0S0U OFF:FO
R A=C1 TO 25:NEXT A:RETURN
MR 7190 COLOR 45:PLOT KP,YP:RESTORE 7250:
FOR X=C1 TO 5:READ A,0:SOUND 0,A,12,10
:FOR Y=C1 TO 0:NEXT Y
LU 7200 FOR Y=10 TO 0 STEP -C1:SOUND 0,A,
12,Y:NEXT Y:NEXT X:LIVES=LIVES-C1:IF
NOT LIVES THEN 7260
EG 7210 COLOR 32:PLOT KP,YP:G0S0U 7110:ON
8R0 G0T0 7230,7220,7230
OY 7220 IF NM<19 THEN 850
AO 7250 G0S0U 7020:G0T0 130
JZ 7250 DATA 85,05,76,25,72,25,05,50,60,1
00
LV 7260 G0S0U 7120:POSITION 4,10:? M6:"en
d of game":IF SCORE<HI THEN 7200
OM 7270 AS=STR$(SCORE):POKE 1699,LEN(AS):
FOR M=C1 TO LEN(AS):POKE 1699+M,VAL(AS
(M,X)):NEXT M
CK 7280 G0S0U 7000:G0T0 1040
RZ 7290 SOUND 0,0,0,0:RETURN
EJ 7300 TIME=TIME-C1:G0S0U 7130:G0S0U 710
0:IF NOT TIME THEN POP 160T0 7190
AO 7310 RETURN
MJ 10000 RESTORE 10061:C=PEEK(1063)-5:0ASE
=(C+C1)*256:POKE 559,0:POKE 106,C:GRAP
HICS 17
KU 10010 FOR X=C1 TO 32:READ Y:MOVES(X)=C
HRS(Y):INEXT X:JUNK=USACOR(MOVES),BASE
-57344:POKE 756,0ASE/256
AT 10020 TRAP 10060:ORAWTO 1057:FOR X=0ASE
+1INSET=0 TO 0ASE+1INSET=07
EC 10030 READ CHANGE:POKE X,CHANGE:NEXT X
:G0T0 10020
IO 10060 POKE 559,254:RETURN
TM 10070 DATA 104,104,104,133,215,104,133,214
,104,133,213,104,133,212,162,4,160,0,1
77,212,145,214,200,200,249
LA 10075 DATA 230,213,230,215,202,200,240
,96
JY 10080 DATA 29,170,85,170,85,170,85,170
,85,2,24,126,90,66,66,90,126,24,15,0,1
26,126,126,126,126,126,0
OK 10090 DATA 10,0,20,24,56,56,112,96,152
,5,0,126,78,94,94,126,126,0,6,0,126,90
,122,122,126,126,0
NF 10100 DATA 7,0,126,126,122,122,98,126,
0,0,126,126,94,94,126,0,12,0,20,24
4,58,62,112,96,152
XE 10110 DATA 13,160,0,12,60,190,127,0,0,
11,16,40,24,20,20,14,6,25,63,16,40,24,
92,124,14,6,25
IO 10120 DATA 27,146,84,0,198,0,84,146,0,
26,254,254,178,138,178,254,254,0,40,12
4,60,100,56,16,24,16,24
TI 10130 DATA 61,0,0,40,94,116,106,62,0,3
0,0,12,56,00,96,74,62,0,32,24,60,60,12
6,126,126,126,0
EK 10140 DATA 3,0,255,126,126,126,255,0,0
PW 10150 DATA 1,124,246,250,254,254,124,6
,16,9,16,16,16,16,16,16,16,16,31,104,
00,104,92,116,56,0,0
OI 10160 DATA 60,0,195,36,24,24,36,0,0,4,
0,0,126,153,36,0,0,42,24,60,36,36,12
6,126,126,126
UD 10170 DATA 43,16,56,124,124,124,124,25
4,8,49,112,64,110,72,126,2,14,0,54,60,
126,90,126,126,126,0,0
NK 10180 DATA 62,12,12,24,24,40,40,0,40

```


SCRAMBLE

Article on page 33.

LISTING 1

```

GP 10 REM SCRAMBLE
GJ 15 REM BY F. NEIL SIMMS
RG 20 REM ANTI MAGAZINE
FF 30 GOSUB 5000:GOTO 1000:REM == init an
d begin ==
RO 30 REM == time delay loop ==
LO 40 IF PEEK(540)<0 THEN 40
ZV 50 RETURN
PZ 53 REM == INPUT: string TP5 ==
OC 54 REM == OUTPUT: LN (nonblank LEN(TP5
)) ==
LP 55 FOR K=1 TO 10:IF TP5(K,K)="" THEN
LN=K-1:POP I:GOTO 65
CN 60 NEXT K:LN=10
AG 65 RETURN
UD 190 REM == move cursor ==
CO 200 TX=K(PLR):TY=Y(PLR):LOCATE TX,TY,Z
:COLOR Z-32:POKE 53760+I,I*40+40:POKE
53761+I,I*60:POKE 77,0
AD 203 IF FIRST(PLR) THEN COLOR Z:FIRST(P
LR)=0
OL 204 PLOT TX,TY
RS 205 IF ST=14 OR ST=10 OR ST=6 THEN TY=
TY-1:IF TY<3 THEN TY=7
CT 210 IF ST=9 OR ST=5 OR ST=13 THEN TY=T
Y+1:IF TY>7 THEN TY=3
MZ 220 IF ST>0 AND ST<12 THEN TX=TX-1:IF
TX<5*NOFF THEN TX=7*NOFF
ZK 230 IF ST>4 AND ST<8 THEN TX=TX+1:IF T
X>7*NOFF THEN TX=3*NOFF
PR 250 LOCATE TX,TY,Z:COLOR Z+32:PLOT TX,
TY:TX(PLR)=TX:Y(PLR)=TY
ZK 260 RETURN
GC 390 REM == mark square or end word ==
AA 400 FIRE(PLR)=1
JK 405 MO=MOROS(PLR):TX=K(PLR):TY=Y(PLR):
LOCATE TX,TY,Z:IF Z>122 THEN 500
TJ 410 IF LT=0 THEN 400:REM == always mar
k square if first letter ==
ZT 420 IF A05(PREVX(PLR)-TX)>1 OR A05(PRE
VY(PLR)-TY)>1 THEN 600
FX 400 POKE 53760+I,I*60+60:POKE 53761+I,
I*60:COLOR Z+120:PLOT TX,TY:PREVX(PLR)=
TX:PREVY(PLR)=TY
SG 490 TS=(TOFF+LT,TOFF+LT)=CHR$(Z-32):IF
LT<9 THEN LNG(PLR)=LT+1
OO 495 GOTO 600
KY 499 REM == square was already marked -
process word if valid ==
HM 500 IF MO>99 THEN SOUND PLR,255,10,0:G
OTO 600:REM == array full ==
UU 505 POKE 53760+I,I*60+60:POKE 53761+I,
I*60:IF LNG(PLR)<3 THEN 515:REM == word
is too short to count ==
AP 510 AOFF=PLR*1000+MO*10:AR5(AOFF+1,AOF
F+10)=TS:(TOFF,TOFF+9):MOROS(PLR)=MO+1
UU 515 TS=(TOFF,TOFF+9)=OL5
KH 520 IF NOT PLR THEN FOR Y=3 TO 7:I=(Y
-3)*5:POSITION 3,Y:Y? #6:#5(I+1,I+5):NE
XT Y:GOTO 540
ES 530 FOR Y=3 TO 7:I=(Y-3)*5:POSITION 12
,10-Y:Y? #6:#5(I+1,I+5):NEXT Y
US 540 LNG(PLR)=0:POKE 87,1:POSITION 1+15
*PLR,11:Y? #6:MOROS(PLR):
UY 550 LOCATE TX,TY,Z:COLOR Z+32:PLOT TX,
TY
ZC 600 RETURN
ZJ 990 REM == main play loop ==
AE 1000 POKE 53761+PLR=2,0
MI 1002 IF STRIG(0) AND FIRE(0) THEN FIRE
(0)=0
PO 1003 IF STRIG(1) AND FIRE(1) THEN FIRE
(1)=0
FM 1004 IF PEEK(542)<0 THEN 1002
OK 1005 POKE 542,5:PLR= NOT PLR:XOFF=9*PL
R:XOFF=10*PLR+1:LT=LNG(PLR):MO=MO*5(P
LR):I=PLR*2:POKE 07,2
FM 1010 ST=STICK(PLR):IF ST<15 THEN GOSU
0 200:GOTO 1030
ZO 1020 T=STRIG(PLR):IF NOT T AND NOT F
IRE(PLR) THEN GOSUB 400
EH 1029 REM == update TIME ==
KE 1030 TI=PEEK(540):IF TI THEN 1050
YM 1035 TIME=TIME-1
HI 1040 POKE 540,60:POKE 07,1:POSITION 9,
11:Y? #6:TIME=" "IF NOT TIME THEN 12
00
H5 1050 GOTO 1000:REM == end of main loop
==
SA 1190 REM == end of round ==
WL 1200 GOSUB 2700:FOR I=10 TO 0 STEP -8,
3:POKE 53279,0:POKE 540,I:GOSUB 40:NE
X I
OT 1205 POKE 07,2:POSITION 5,0:Y? #6:"dupl
icates:"FOR L=0 TO 1
GH 1210 IF MOROS(L)>1 THEN PLR=L:GOSUB 30
00
GG 1220 NEXT L
GI 1230 IF MOROS(0)<1 OR MOROS(1)<1 THEN
1240
LL 1235 GOSUB 2000:POSITION 5,0:Y? #6:"no
tches:"I:GOSUB 3300
PA 1240 GOSUB 2000:POSITION 1,9:Y? #6:"acc
ept < > reject"
YK 1250 POSITION 5,0:Y? #6:"XXXXXXXXX "IF
OR L=0 TO 1:PLR=L:GOSUB 3500:NEXT L
UI 1260 POSITION 8,0:FOR I=0 TO 9:Y? #6:OL
5:OL5:NEXT I:POSITION 1,4:Y? #6:"XXXXXXXX
XXXXXXXXXXXXXXXXX":POKE 540,200:GOSUB 40
PM 1270 IF SCORE(0)<MIN AND SCORE(1)<MIN
THEN 1300:REM == skip following if not
end of game ==
PK 1280 IF SCORE(0)>SCORE(1) THEN WINNER=
0:GOTO 1295
CT 1285 IF SCORE(0)=SCORE(1) THEN 1297
NM 1290 WINNER=1
YF 1295 POSITION 2,6:Y? #6:"player "M:MINN
ER+1:MINSI=GOTO 1290
LJ 1297 POSITION 5,6:Y? #6:"it's a tie"
RY 1299 FOR I=50 TO 250 STEP 3:POKE 540,0
:GOSUB 40:SOUND 0,I,10,6:SOUND 1,300-I
,10,6:NEXT I:GOSUB 2700:GOTO 1500
OC 1300 GOSUB 4000:GOSUB 2000:GOSUB 2500:
ROUND=ROUND+1:POKE 07,1:POSITION 13-1*
(ROUND),9,13:Y? #6:ROUND:GOSUB 2600
ZA 1340 GOTO 1000:REM == start next round
==

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continued on next page

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OJ 1500 GOSUB 2600:GOSUB 5000:GOTO 1000:R
EM ** end of game - restart **
IN 1990 REM ** display letter grid **
ZO 2000 POKE 07,2: ? H6:ICR5(125):POSITION
6,0: ? H6: "BCRNGCLB"
RK 2005 FOR I=1 TO 25: C=INT(PEEK(RANDOM)*
96/256)+1:05(I,1)=C:INERT I
KH 2010 FOR Y=3 TO 7: C=(Y-3)*5: POSITION 3
,Y: ? H6:05(I+1,I+5): POSITION 12,10-Y: ?
H6:05(I+1,I+5): INERT Y
UO 2039 REM ** border **
WF 2040 FOR Y=2 TO 10 STEP 6: FOR H=2 TO 8:
POSITION H,Y: ? H6: "C": POSITION H+9,Y: ?
H6: "C": INERT H: INERT Y
MO 2050 FOR H=2 TO 10 STEP 6: FOR Y=3 TO 7:
POSITION H,Y: ? H6: "C": POSITION H+9,Y: ?
H6: "C": INERT Y: INERT H
OC 2060 FOR I=0 TO 1: PLR=I: HOFF=9*PLR: GOS
UB 200: NEXT I
AC 2100 RETURN
VF 2490 REM ** build scoring window **
LL 2500 POKE 07,1: FOR I=0 TO 15 STEP 15: P
OSITION I,10: ? H6: "000000"
NN 2510 POSITION I+1,11: ? H6: "0 " : POSIT
ION I,12: ? H6: "000000": POSITION I+1,13
: ? H6: SCORE(I-14*(I-15)): INERT I
OO 2515 SOUND 0,120,10,0: POKE 540,10: GOS
UB 40: GOSUB 2700
OU 2520 POSITION 0,10: ? H6: "0000": POSITIO
N 9,11: ? H6: "2000": POSITION 8,13: ? H6: "
Round: "
AZ 2550 RETURN
PL 2590 REM ** "go on" prompt **
JZ 2600 POKE 07,2: POSITION 0,9: ? H6: "Pres
s ENTER to go on" IF PEEK(53279)=6 THEN
POP : GOSUB 5000: GOTO 1000
VK 2610 IF STRIG(0) AND STRIG(1) THEN POS
ITION 6,9: ? H6: "FIRE": GOTO 2600
XO 2620 IF NOT STRIG(0) OR NOT STRIG(1)
THEN 2620
GO 2630 POSITION 0,1: ? H6: 0L5: 0L5: POSITIO
N 0,9: ? H6: 0L5: 0L5: RETURN
OO 2690 REM ** turn off sound **
FO 2700 POKE 53761,0: POKE 53765,0: RETURN
PR 2790 REM ** 4 clicks **
MG 2800 FOR I=1 TO 4: POKE 540,5: POKE 5327
9,0: GOSUB 40: NEXT I: RETURN
CF 2990 REM ** find and delete dups **
IP 3000 FOR I=1+1000*PLR TO WOROS(PLR)*10
-1+1000*PLR STEP 10: TP5=ARS(I,I+9): OUP
P=0: POKE 53279,0
IU 3020 IF TP5=0L5 THEN 3060
SZ 3025 FOR J=I+10 TO WOROS(PLR)*10-1+10
00*PLR STEP 10
IU 3030 IF TP5<>ARS(J,J+9) THEN 3055
OK 3035 IF PEEK(540)<>0 AND NOT OUP THEN
3035
OR 3037 IF NOT STRIG(0) OR NOT STRIG(1)
THEN 3037
NM 3040 ARS(J,J+9)=0L5: IF NOT OUP THEN P
OSITION 0+10*PLR,1: ? H6: TP5: POKE 540,1
20: OUP=1
GL 3055 NEXT J
FJ 3060 NEXT I
NA 3070 POKE 540,120: GOSUB 40: POSITION 0+
10*PLR,1: ? H6: 0L5: RETURN
CO 3290 REM ** find matches and eliminate
**
DK 3300 FOR I=1 TO WORDS(0)*10-9 STEP 10:
TP5=ARS(I,I+9): POKE 53279,0: IF TP5=0L5
THEN 3300
SX 3325 FOR J=1001 TO WOROS(1)*10-9+1000
STEP 10
OB 3330 IF TP5<>ARS(J,J+9) THEN 3375
VF 3340 GOSUB 40: IF NOT STRIG(0) OR NOT
STRIG(1) THEN 3340
WP 3350 ARS(J,J+9)=0L5: ARS(I,I+9)=0L5: POS
ITION 0,1: ? H6: TP5: POKE 540,100: POP : G
OTO 3300
GN 3375 NEXT J
FV 3380 NEXT I
VY 3390 GOSUB 40: POSITION 5,1: ? H6: 0L5: RE
TURN
ZC 3490 REM ** let players review words **
MF 3500 NONE=1: FOR I=1+1000*PLR TO WOROS(
PLR)*10-9+1000*PLR STEP 10: TP5=ARS(I,I
+9): IF TP5=0L5 THEN 3600
AC 3530 POSITION 0+10*PLR,1: ? H6: 0L5: FOR
N=1 TO 10: POSITION 10+10*PLR-N,1: ? H6:
TP5(1,N): INERT N: NONE=0
NU 3540 S1=STICK(0): S2=STICK(1): POKE 540,
20
TL 3550 IF S1<>7 AND S2<>7 THEN 3560
OZ 3555 POSITION 12,9: ? H6: "000000": SOUND
0,200,12,6: GOSUB 40: POSITION 12,9: ? H6:
"000000": GOTO 3590
SM 3560 IF S1<>11 AND S2<>11 THEN 3540
KR 3565 POSITION 1,9: ? H6: "000000": SOUND
0,100,0,6: GOSUB 55: A00=1*(LN(5)+LN(3)
*LN(0)=5)
PV 3570 SCORE(PLR)=SCORE(PLR)+A00: POKE 07
,1: POSITION 1+15*PLR,13: ? H6: SCORE(PLR
): POKE 07,2
NV 3580 GOSUB 40: POSITION 1,9: ? H6: "accep
t"
KL 3590 IF NOT STRIG(0) OR NOT STRIG(1)
THEN 3590
OG 3600 GOSUB 2700: GOSUB 40: INERT I
GA 3605 IF NONE THEN POSITION 1+10*PLR,1:
? H6: "no words": POKE 540,200: GOSUB 40
AU 3610 POSITION 0+10*PLR,1: ? H6: 0L5: RETU
RN
GY 3990 REM ** initialize var's **
AK 4000 ARS="" : ARS(2000)=ARS: ARS(2)=ARS:
TS=ARS: FOR I=0 TO 1: LNG(I)=0: WOROS(I)=
0: FIRST(I)=1: INERT I
SL 4010 H(0)=S1(I)=12: V(0)=S1(I)=3: TIME
=200
AR 4050 RETURN
RJ 4990 REM ** initialize **
EI 5000 GRAPHICS 2: OL=PEEK(560)+256*PEEK(
561): MIN=50: RANDOM=53270: SETCOLOR 4,6,
2: GOAL=50
SH 5030 FOR I=15 TO 10: POKE OL+I,6: NEXT I
JK 5040 POKE OL+19,65: POKE OL+20,PEEK(560
): POKE OL+21,PEEK(561)
ZK 5060 DIM ARS(2000), TS(20), LNG(1), WOROS
(1), K(1), V(1), PREVX(1), PREVY(1), 09(25)
, LS(96), 0L9(10), TP5(10), SCORE(1)
MP 5070 DIM FIRST(1), FIRE(1)
OG 5075 LS="AAAAAAAAA00000000000000000000PP
FGG6XHXIIIIIIJKL111111111111111111111111
P0RRRR5555555555555555555555555555555555
5U 5080 GOSUB 4000: 0L5=TS: SCORE(0)=0: SCOR
E(1)=0
FJ 5100 GOSUB 2000: GOSUB 2500: ROUND=1: POK
E 07,1: POSITION 13,13: ? H6: ROUND: POSIT
ION 1,13: ? H6: "0 " : POSITION 16,13
IE 5110 ? H6: "0 " : POKE 07,2
CJ 5120 POKE 540,15: POSITION 2,9: ? H6: "se
lect GOAL: " : GOAL: " "
VZ 5130 POSITION 0,1: ? H6: "Press ENTER to
begin": GOSUB 40
OO 5140 N=PEEK(53279): IF N=6 THEN 5170
OV 5150 IF N=5 THEN GOAL=GOAL+50: IF GOAL=
200 THEN GOAL=50: POSITION 15,9: ? H6: GO
AL: " "
JK 5160 POSITION 2,9: ? H6: "START": POKE 540,15: GOSUB
40: GOTO 5120
IN 5170 POSITION 0,1: ? H6: 0L5: 0L5: POSITIO
N 0,9: ? H6: 0L5: 0L5: MIN=GOAL
AH 5200 RETURN

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WIDE TEXT

Article on page 34

See

TYPE II

Page 52

LISTING 1

```

VE 10 REM WIDETEXT.BAS
YY 20 REM BY BILL MORRIS
RH 30 REM ANTIC MAGAZINE
KW 40 GOSUB 20000:POKE 710,144
HL 50 CLR :DIM A$(40)
LK 60 ? "W":? :?
XP 70 ? " 8V-A-P-H-A-C-S+ 1 & GRAPHICS
D":? :?
RL 80 ? " 8V":?
ZP 90 ? :? " 8V-A-P-H-A-C-S+ 1 & GRAPHICS
CR 100 X=USR(1536)
UI 110 GOSUB 7300
HD 120 POKE 712,0
PB 130 ? :? " WIDETEXT IS A BASIC PROGRAM
THAT"
QM 140 ? "USES A LITTLE MACHINE LANGUAGE
TO"
WM 150 ? "CREATE A GR-1 CHARACTER SET THA
T"
XL 160 ? "USES A DIFFERENT SET OF RULES:"
PL 170 ? :? "1.THEY CAN GO ANYWHERE ON TH
E SCREEN"
MT 180 ? "2.THE COLOR MATCHES THE GR-1 TE
XT."
AC 190 ? "3.THE BACKGROUND STAYS INTACT."
JN 200 ? "4.INVERSE VIDEO WORKS."
JR 210 ? "5.EACH WIDE LETTER IS PRINTED W
ITH 2"
NK 220 ? " KEYSTROKES: LOWER CASE A + C O
NTROL"
KO 230 ? " A GIVE US A WIDE A."
UP 240 GOSUB 7300
OO 250 ? " TO GET USER INPUT, OF COURSE,
HE"
OE 260 ? "CAN'T EXPECT A USER OF OUR PRG
RAMS"
CV 270 ? "TO INPUT ANYTHING REQUIRING 2 5
TROKES"
OL 280 ? "PER LETTER. HERE IS A ROUTINE T
HAT"
MV 290 ? "GETS AS IN THE PROGRAM'S CHOICE
OF"
CA 300 ? "WIDE OR NORMAL CHARACTERS"
UK 310 GOSUB 7300
OG 320 LIST 6000,6090:LIST 6400,6600
UD 330 GOSUB 7300
TV 340 GOSUB 6020
OC 350 END
OH 6000 REM WIDETEXT INPUT,NORMAL INPUT
VH 6010 DIM A$(40)
EY 6020 OPEN #1,4,0,"K:"
WO 6030 ? "YOUR FAVORITE COMPUTER?"
KW 6040 WIDE=0:GOSUB 6400
FH 6050 OPEN #1,4,0,"K:"
MH 6060 ? "YOUR FAVORITE MAGAZINE?"
JA 6070 A$(1)=" ":A$(40)=A$(2)=A$(3)=A$(4)=A$(5)=A$(6)=A$(7)=A$(8)=A$(9)=A$(10)=A$(11)=A$(12)=A$(13)=A$(14)=A$(15)=A$(16)=A$(17)=A$(18)=A$(19)=A$(20)=A$(21)=A$(22)=A$(23)=A$(24)=A$(25)=A$(26)=A$(27)=A$(28)=A$(29)=A$(30)=A$(31)=A$(32)=A$(33)=A$(34)=A$(35)=A$(36)=A$(37)=A$(38)=A$(39)=A$(40)
LR 6080 WIDE=1:GOSUB 6400
OF 6090 RETURN
RF 6400 REM *** INPUT ROUTINE***
ZC 6410 N=1
KC 6420 GET #1,R
NJ 6430 IF R=155 THEN G510
YK 6440 IF WIDE=0 THEN G400
NF 6450 IF R=32 THEN ? " ":GOTO 6490
CL 6460 L=R+32:7 CHR$(L):

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MV 6470 C=R-64:7 CHR$(C):GOTO 6490
XD 6480 ? CHR$(R):
AA 6490 A$(N,N)=CHR$(R)
GH 6500 N=N+1:GOTO 6420
AH 6510 ? :? A$:CLOSE #1:RETURN
AU 6520 RETURN
EU 7300 POSITION 2,22
GM 7310 ? " PRESS DEL TO
CONT."
FF 7320 OPEN #1,4,0,"K:"
KM 7330 GET #1,R
NH 7340 CLOSE #1
LR 7350 ? "W"
OO 7360 RETURN
SL 20000 FOR A=1536 TO 1702:READ B:POKE A
,B:NEXT A:RETURN
ZO 20010 DATA 104,169,0,133,69,133
FY 20020 DATA 204,133,206,133,71,56
5Y 20030 DATA 165,89,233,1,133,72
FJ 20040 DATA 233,1,133,207,233,1
NT 20050 DATA 133,205,233,1,133,70
L5 20060 DATA 160,0,105,0,224,145
YY 20070 DATA 69,105,0,225,145,204
MT 20080 DATA 141,254,6,74,74,74
FL 20090 DATA 74,141,255,6,173,254
AA 20100 DATA 6,41,15,32,106,6
ZH 20110 DATA 145,206,173,255,6,32
OR 20120 DATA 106,6,145,71,200,192
OI 20130 DATA 200,208,213,105,0,224
OR 20140 DATA 145,69,105,0,225,145
FT 20150 DATA 204,105,0,226,145,206
SI 20160 DATA 185,0,227,145,71,200
HD 20170 DATA 192,255,208,231,165,70
OG 20180 DATA 141,244,2,96,170,41
NC 20190 DATA 8,201,0,208,7,138
RA 20200 DATA 24,105,104,76,121,6
AK 20210 DATA 138,170,41,4,201,4
RO 20220 DATA 200,7,138,24,105,44
TJ 20230 DATA 76,136,6,138,170,41
GF 20240 DATA 2,201,2,208,7,138
HP 20250 DATA 24,105,10,76,151,6
VE 20260 DATA 138,170,41,1,201,1
HR 20270 DATA 200,7,138,24,105,2
SH 20280 DATA 76,166,6,138,96,8

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LISTING 2

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0100 : WIDETEXT INPUT,NORMAL INPUT
0110 : BY BILL MORRIS
0120 :
0130 ONECHAR =%6FE : TEMPORARY
0140 HALTCAR =%6FF : HALTER5
0150 CHIAS =%2F4 : CHAR SET PRINTER
0160 NUMBERS =%45 : BORROWED FROM DUP
0170 CAPS =%CC : SAFE FROM BASIC
0180 CONTROL =%CE
0190 LOWER =%47 : ALSO BELONGS TO DUP
0200 ==%0600
0210 PLA : SETUP RETURN TO BASIC
0220 : LD BYTE OF PAGE # VARIABLES =%0
0230 LDA #0
0240 STA %45 : LD BYTE NUMBERS AOR
0250 STA %CC : LD BYTE CAPS AOR
0260 STA %CE : LD BYTE CONTROL CHARS

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continued on page 49

```

0270 STA 547 : LD BYTE LOWER CASE
0280 SEC
0290 LDA 559 : PAGE # SCREEN MEMORY
0300 SBC #1
0310 STA 548 : PAGE # LOWER CASE
0320 SBC #1
0330 STA 5CF : PAGE # CONTRL CHARS
0340 SBC #1
0350 STA 5C0 : PAGE # CAPS
0360 SBC #1
0370 STA 546 : PAGE # NUMBERS
0380 LDY #8 : SET COUNTER
0390 : BEGIN SPREADING LETTERS.
0400 : ONE BYTE AT A TIME
0410 START LDA SE000.Y : COPY NUMBERS
0420 STA (NUMBERS).Y : STORE THEM
0430 LDA SE100.Y : COPY CAPS
0440 STA (CAPS).Y : STORE UNCHANGED
0450 STA ONECHAR : MAKE EXTRA COPY
0460 LSR A : SHIFT LEFT
0470 LSR A : NYBBLE INTO
0480 LSR A : RIGHT NYBBLE, LEAVING
0490 LSR A : LEFT NYBBLE EMPTY
0500 STA HALFCHAR : FILE IT AWAY
0510 LDA ONECHAR : THAT EXTRA COPY
0520 AND #50F : KILL LEFT NYBBLE
0530 JSR BITS : SPREAD RIGHT NYBBLE
0540 STA (CONTROL).Y : STORE RIGHT
0550 : HALF OF NEW LETTER
0560 LDA HALFCHAR : GET OTHER HALF
0570 JSR BITS : SPREAD IT
0580 STA (LOWER).Y : STORE LEFT HALF
0590 INY : COUNTER = COUNTER +1
0600 CPY #260B : 0 BYTES TO A LETTER
0610 : 26 LETTERS TO AN ALPHABET
0620 ONE START : NEXT Y
0630 FINISH LDA SE000.Y : STORE
0640 STA (NUMBERS).Y : MISC.
0650 LDA SE100.Y : CHARACTERS
0660 STA (CAPS).Y : UNCHANGED
0670 LDA SE200.Y
0680 STA (CONTROL).Y
0690 LDA SE300.Y
0700 STA (LOWER).Y
0710 INY
0720 CPY #5FF : DONE
0730 ONE FINISH
0740 LDA 546 : FIRST PAGE # NEW SET
0750 STA CH0A5 : POKED INTO POINTER
0760 RTS : RETURN TO BASIC, OYE OYE
0770 :
0780 : SUBROUTINE TO SPREAD HALF
0790 : A BYTE INTO THE FULL BYTE
0800 :
0810 BITS TAX : SAVE A COPY
0820 AND #8 : SEE IF BIT 3 IS ON
0830 CMP #0 : 00001000
0840 ONE BIT2 : IF NOT GO TO BIT2
0850 TAX : GET THE COPY
0860 CLC :
0870 ADC #500 : BIT 3 OFF, 6 & 7 ON
0880 : 11000000
0890 JMP CLR2 : BYPASS NEXT LINE
0900 BIT2 TAX : GET UNALTERED COPY
0910 CLR2 TAX : STASH LATEST VERSION
0920 AND #4 : SEE IF BIT 2 IS ON
0930 CMP #4 : 00000100
0940 ONE BIT1 : IF NOT, THEN BIT1
0950 TAX
0960 CLC
0970 ADC #52C IF 50, 00 THIS
0980 JMP CLR1 : 00110000
0990 BIT1 TAX
1000 CLR1 TAX
1010 AND #2 : BIT 1?
1020 CMP #2 : 00000010
1030 ONE BIT0

```

```

1040 TAX
1050 CLC
1060 ADC #50A : BECOMES
1070 JMP CLR0 : 00001100
1080 BIT0 TAX
1090 CLR0 TAX
1100 AND #1 : 00000001
1110 CMP #1
1120 ONE BIT06
1130 TAX
1140 CLC
1150 ADC #502 : 00000011
1160 JMP CLR06
1170 BIT06 TAX
1180 CLR06 RTS : RETURN

```

LISTING 3

```

HE 10 REM PEEKER
YY 20 REM BY BILL MORRIS
RH 30 REM ANTIC MAGAZINE
OK 40 N=20010:REM DATA STATEMENTS WILL ST
ART WITH THIS LINE NUMBER
NM 50 FOR A=1536 TO 1701 STEP 6
OK 60 ? CHR$(125):POSITION 2,6
VE 70 ? X:" DATA ":
50 80 ? PEEK(A):",":
FJ 90 ? PEEK(A+1):",":
TH 100 ? PEEK(A+2):",":
TX 110 ? PEEK(A+3):",":
UN 120 ? PEEK(A+4):",":
RX 130 ? PEEK(A+5):
GB 140 POSITION 2,6:POKE 042,13:POSITION
2,7:" CDONT"
FX 150 POSITION 2,4:STOP
MM 160 POKE 042,12
PY 170 X=X+10
DF 180 NEXT A
DI 190 END

```

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TOUCH TABLET CURSOR

Article on page 36

LISTING 1

```

YU 10 REM KOALA CURSOR DEMONSTRATION
BH 20 REM BY KARL E. MIEGERS
RH 30 REM ANTIC MAGAZINE
EH 40 AD=1593:REM AD=1596 FOR ATARI TOUCH
    TABLET.
OZ 50 DATA 104,169,7,162,6,160,10,76,92,2
    20,173,112,2,141,0,200,160
MA 60 DATA 6,169,0,145,205,136,16,251,173
    ,113,2,133,205,160,0,177,203
AL 70 REM 60 DATA 6,169,0,145,205,136,16,
    251,169,220,56,237,113,2,133,205,160,0
    ,177,203
IR 80 REM FOR TOUCH TABLET, USE THE ABOVE
    DATA LINE IN PLACE OF LINE 60.
VE 90 DATA 145,205,200,192,7,200,247,165,
    20,201,4,200,7,206,192,2,169
IT 100 DATA 0,133,20,76,90,220,104,160,90
    ,162,220,169,7,76,92,220
RR 110 REM RESERVE 0 PAGES OF RAM FOR PM
    GRAPHICS
BY 120 RANTOP=PEEK(106)-8
HM 130 PMBASE=RANTOP*256
OH 140 POKE 106,RANTOP-4
YH 150 GRAPHICS 17
MS 160 POKE 54279,RANTOP
LR 170 POKE 559,0
ON 180 REM LOAD VERTICAL BLANK INTERRUPT
    ROUTINE INTO PAGE 6
KN 190 FOR I=1 TO (AD-1526):READ A:POKE 1
    535+I,A:NEXT I
FO 200 FOR I=PMBASE+1024 TO PMBASE+1279:P
    OKE I,0:NEXT I
SV 210 POKE 205,0:POKE 204,RANTOP
GW 220 POKE 205,0:POKE 206,RANTOP+4
RV 230 REM LOAD PLAYER DATA
VL 240 FOR I=0 TO 6:READ A:POKE PMBASE+I,
    A:NEXT I
VC 250 DATA 120,64,32,20,12,30,6
ZA 260 GRAPHICS 17
JR 270 POSITION 4,1:?" MENU ***"
JK 280 POSITION 5,5:?" MENU item 1"
HM 290 POSITION 5,7:?" MENU item 2"
IR 300 POSITION 5,9:?" MENU item 3"
CJ 310 POSITION 0,11:?"QUIT"
OV 320 REM TURN ON PMG AND INITIALIZE TIM
    ER
RM 330 POKE 559,62
VM 340 POKE 53277,3
EM 350 POKE 20,0
AO 360 REM TURN ON VBI ROUTINE. TO TURN I
    T OFF, USE A=USR(AD)
VW 370 A=USR(1536)
OZ 380 FOR I=1 TO 100:NEXT I
EA 390 IF STICK(0)=15 THEN 390
NZ 400 IF PEEK(205)>63 AND PEEK(205)<74 T
    HEN GOTO 450
MM 410 IF PEEK(205)>79 AND PEEK(205)<90 T
    HEN GOTO 520
TS 420 IF PEEK(205)>95 AND PEEK(205)<106
    THEN GOTO 600
KK 430 IF PEEK(205)>111 AND PEEK(205)<122
    THEN GOTO 750
OG 440 GOTO 390
VH 450 GRAPHICS 10:POKE 559,62:POKE 53240
    ,0
GU 460 A=USR(AD)
PW 470 POSITION 4,3:?"AT OPTION ONE"
CO 480 POSITION 2,7:?"MENU"
    ?"?"
PC 490 FOR I=1 TO 100:NEXT I
WI 500 IF STICK(0)=15 THEN 500
OK 510 GOTO 260
PI 520 GRAPHICS 2:POKE 559,62:POKE 752,1
LV 530 POKE 700,0:POKE 709,0:POKE 710,19
    0
RZ 540 POSITION 6,2:?"? + 5 = ?"
FA 550 POSITION 4,6:?"10 12 2 16"
KU 560 ? " Point to answer and press butt
    on"
OM 570 IF STICK(0)=15 THEN 570
OL 580 LM=16050-10*AD
RF 590 IF PEEK(625)<LM OR PEEK(625)>LM+17
    THEN 570
PG 600 IF PEEK(624)>99 AND PEEK(624)<121
    THEN GOTO 620:REM PAOOLE(0)
WP 610 POSITION 3,0:?"SORRY-TRY AGAIN
    ":FOR I=1 TO 50:NEXT I:GOTO 570
UV 620 POSITION 3,0:?" CORRECT!!
    "
RM 630 POSITION 14,2:?"?"
MW 640 ? " PRESS BUTTON FOR MENU"
OM 650 FOR I=1 TO 100:NEXT I
OU 660 IF STICK(0)=15 THEN 660
ON 670 GOTO 260
VP 680 GRAPHICS 10:POKE 559,62:POKE 53240
    ,0
NE 690 A=USR(AD)
ZA 700 POSITION 3,3:?"AT OPTION THREE
    "
CF 710 POSITION 2,7:?"MENU"
    ?"?"
OR 720 FOR I=1 TO 100:NEXT I
OO 730 IF STICK(0)=15 THEN 730
OS 740 GOTO 260
OZ 750 POKE 53240,0:A=USR(AD)
KK 760 POKE 106,PEEK(106)+12
ZK 770 POKE 559,3:GRAPHICS 0:NEXT

```

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DISKIO

Article on page 40.

LISTING 1

```

OL 1 REM DISKIO VERSION 4.3 -- BY BERNARD
  OPPENHEIM. ANTIC, JANUARY, 1985. PUB
  LIC DOMAIN. REQUIRES DOS 2.05.
HN 2 DIM OATS(1143),CHS(2):K32=32768:IF PE
  EK(1693)=255 THEN 10
EN 3 FOR I=1 TO 150:READ N:PDK=1535+I,N:
  NEXT I
NV 4 DATA 104,104,104,133,205,104,104,170
  ,104,133,204,104,133,203,24,165,203,10
  ,1,205,133,203,144,2,230,204,160
NC 5 DATA 0,177,203,133,212,200,177,203,1
  33,213,40,72,232,220,212,240,10,134,21
  2,165,213,9,120,133,213,200,57
KS 6 DATA 200,177,203,133,205,56,233,3,13
  3,206,169,0,160,74,144,2,9,120,01,203,
  200,196,206,144,244,133,207,74,74
DD 7 DATA 74,74,201,10,144,3,24,105,7,105
  ,40,209,203,200,13,200,200,196,205,240
  ,167,136,165,207,41,15,16,230,96
KL 8 DATA 104,104,133,204,104,133,203,160
  ,0,132,213,177,203,56,233,40,201,10,14
  4,2,233,7,10,10,10,10,133,212
PT 9 DATA 200,177,203,56,233,40,201,10,14
  4,2,233,7,24,101,212,133,212,96,10
PJ 10 GOSUB 19:LN=USR(1536,LENN,LINE0,ADR
  0):IF LNK32 THEN PDK=1693,255:LIST 1
  N:END
2K 11 IF LNK32 THEN PDK=1693,255:LN=LN-
  K32:?"LINE ":"LN:" IS MISSING":END
BM 12 ? "READY TO CREATE AUTDRUN.SYS FILE
  ?":CLDSE M1:OPEN M1,4,0,"K":GET M1,K
  :IF K<09 THEN END
RM 13 CLDSE M1:OPEN M1,0,0,"D":AUTDRUN.SYS
  "":RESTORE M1:CHADR=ADRCHS:ITRAN 18
DD 14 READ DATS:I=LENN(DATS)-2:IF ASC(DATS
  3)>47 THEN IF ASC(DATS3)<71 THEN 17
GO 15 FOR I=1 TO LCHNS=DATS3:I=N=ASC(CHNS)
  :IF N=33 THEN M=155
ND 16 PUT M1,M:NEXT I:GOTO 14
O2 17 FOR I=1 TO L STEP 2:CHNS=DATS3:I=N:M
  SR(1647,CHADR):PUT M1,M:NEXT I:GOTO 14
YK 18 CLDSE M1:END
VS 19 ADR0=PEEK(130)+256*PEEK(139):LINE0=
  PEEK(ADR0):LENN=PEEK(ADR0+2):RETURN
WD 20 DATA FFFFC1D34296AD0A0B01A0C9CAF009C9
  00D06CA923BDF71DA58C0D4A1EAS00D04049
MD 21 DATA 1EA949050CA91E850ADF9A2E26051
  26A02488888891AB3C945D0F6091083056A
TD 22 DATA C0A9FC9918083091C0305CCA91C991C
  03A06F81C099FC1C0818F0A9860D001DA91E
NH 23 DATA 10D0D11010A00A01C069010D001D0C
  01C0690000D091DA93500E702A929D000E082EC
RU 24 DATA 60203CF680E998F005ECF91D206896
  480A48A20605C848CA18F80971DF0370516
KU 25 DATA C0A988BDF91D0580BDFE82ADF202F8
  268ADF61D00030EF61D0ECF61D0075A96493
SI 26 DATA 85C0A91E05C000032F01DA0AFFC0C4
  C0FF8F681C0C9FF050297F9D0005D0E00100
IR 27 DATA C810EAC004CE01C40C001C4006000
  0000223100C001C810F001069034C302082
FF 28 DATA A000040A92990005C004C004CEA9
  22C0F71DF00A0A95505C0A91E05CC4CA52873
DS 29 DATA A5D00D0CA9001865C008524A9858525
  A9850522A2F96095D02E830F0A0A0A00A9AA
L2 30 DATA 90206020481520271DA900BDF91D068

```

```

FF505046494E442F4026252F011E25444906
AK 31 DATA D21F362EC2126344454CA0E2004445
  4C4554C520712EC021654C4F43C82072E60
HM 32 DATA D52165554EAE20A4554E4C4F43C020
  792CE2165245AE20A452454E4140C52015
TF 33 DATA 7040494CC020972EC5216545AE20A4
  45454450220E32ECC21654C4FAE20A44CAFF
DA 34 DATA 4F41C420E32ED221655254E4C4215A
  2ED3216553AE20A4534156C520E37ED002166
SK 35 DATA 634C49AE20A44C495354C4215A4CAE
  20A44C4953041E252EC22165424CAE20A400
DH 36 DATA 424C4F41C4206064854C002683464F
  524041D0425192EC021634DAE20A44D4F5650
DM 37 DATA C523E657444F03249CEFF44313A2A2E
  2A90200419A9020552A931A004C4C0D0003DA
SR 38 DATA A0030500F81D00D31FA006093040A9
  1F40A9032006259010034C023206722A930
NK 39 DATA 000DEE0505D1A970D00C605A91D00C7
  05A9980DC005A9C640A90540A020A909A20A9
AD 40 DATA 002006250A0EE050010A91C80D6C850D
  C705A99000C0052056E4207C22A228F81070
CD 41 DATA A5D1690185D1D02901F00A9A905C05C
  A90505C0D000A9D0A5C0A90505C0A9C0408F
AL 42 DATA ASC40A0A1A90520062598100620804
  194C061EEEEE05A000A970D01C0D007CE00EC
DY 43 DATA 05A0120001C0C091C0000F07C001C8
  C091C0A0000A5D129F00006A92091C0D000960
CV 44 DATA 4A4A4A4A8693091C0CA0501290F18
  093091C0F490C0A9200D0005D009054CA23A
NR 45 DATA 1F282D204C061E0D0F05A4CE200F20
  20C324A5D0F00560604C061E06CEA20A0A944
PP 46 DATA 00A4C0D99005039805C0A0A00055
  CE40A990560040A0E0F05C0905060402052
MK 47 DATA D62590100060600904C0C2300A92100
  01A92300A0A92400A9A4CE200F202056252C
OD 48 DATA F00530074C061EA9200096A900050D
  4C261EAD4A1C050C0A0181E050D471E40000
AE 49 DATA 000FF010A4CE001C8297799000501
  C03000C20C20E6C110E0C01C648C00110
PV 50 DATA C40A44CE000FC0056C0A4C0D008900
  059901A05CCFF005D0F4A92099000500A4CEA5
EK 51 DATA 200F2020C324C261E203321ADF71D
  090005D0613C0CA0A990005D0F27C0820030
XD 52 DATA A93199000500520C20C0A0F71D09900
  05C20C0F009449900005C20C20A0F71D0990
DF 53 DATA 990005C020C20A09A9300000000000
  05C9200020C4C0F81C1C6C00F00509018562
UE 54 DATA 990005C4C0F003C010F7A920990185
  ACF005100960A4CEA920997F05D00006000D
CM 55 DATA A5C0C902F864AD02053C30305D0C93A
  105930E920C91000020A9000F71A5D03050A
BB 56 DATA 30E9208D205C91C3000AC91A1006A5
  C0C9030000ADF1050DF205A9A000DF105A50F
AY 57 DATA C840A5CC4830A5056191205C0A559E9
  0005CC0A1501C0D0005A920E3D202A9142014
LA 58 DATA 30220000181C00096060A90005D04C
  261EC0F20500E7080ADF1A529771C1C0D00D0E
KE 59 DATA C8C681C0C900F0A0C900001A9200D
  01050D0202C6F10530300308305A0012033F
IL 60 DATA 21A9002030220A00202022A9202847
  22A90F0203022A00702D2026005CC6005C02F
FM 61 DATA A90105CE44A52001C0F000620542220
  4722050F10306C6C1065C0805C080626CC4A
NV 62 DATA 000D0005982000020C02060A0000A
  2A2A2A2A2003A00290F1D6522602040000A
IR 63 DATA 6018A55069160DF505A55969000DF6

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```

05A9FFBDF7056020A623EEF705AEF705F035
UG 64 DATA 18F00020A91191586009000DF90520
A020200023CECF005F011A020207E23A0000A0
EH 65 DATA 209223A920203D2200EA0014207E23
A000209223A212A014209423A00501C000031
DG 66 DATA 034C1F23A90220302230A5C0E91400
F305A5CCE9000DF405A212A000200023A2E7
SG 67 DATA 24A020200023202F23200123A02020
7E2320A623A002209223200123A914203D96
SC 68 DATA 22A224A020209423A212A02000023
A013090005F003202F23A027A90091500005
RA 69 DATA 18F00020A91191586009000DF90520
4423ADF905F001602001232044236A0DF7E5
FD 70 DATA 050DF005A0000207E23A0200A012C0E8
C00CF015090005D00005300DF0F0A212A04C
PH 71 DATA 20209423CECF90560A00209223A9D0
203222CECF005D0C060A200A9120DF40A050181
Y0 72 DATA C09D0005E8C0CEFA0500F40A200A9
120DF40500000591C0E0C0CEFA0500F46010
CU 73 DATA ADF0505C0ADF05055CC60A0F30505
C0ADF40505CC6040ADF71D0C923F014200498
HP 74 DATA 1960A2FF9A05092C410930034C009
4340960A2020E860420E60D20A4194C06F6
DM 75 DATA 1EA9032020208A59040A59140A9079D
420330ADE50E25900DF005A0ADE60E25913D
GS 76 DATA 0DFE0520E52590107CC900D0A90049
030DFE050D40030DF005200019A4CEA931D0
AD 77 DATA D90105D02EA9490DA926A9A9A22620
0E19A0FF0FC02CCFC02F0F0A0AFC020CFC42
HL 78 DATA 02A220C93ED00CA9FF0DF0E2A99D40
A924D00E4CEA9319901059010690040A9A3
OH 79 DATA 0540000058C0CEFA0500F40A200A9
A59140A9009D420A3CFF05A0ADF0E520E250F
UT 80 DATA 9030001007A900A2262006192000419
A9000DF0E24C061E453AA270ADF010000A40
NR 81 DATA 2A090940A9244A00000A9320062590
30091D094313A44F532E535953A5D00056
BC 82 DATA 0160A200A90040A90540A4CDA93F99
0005C0A900200625200419A0004A91040A950
DH 83 DATA 2540A903200625A000A91040A92540
A907200625000A9CFA2262000E1920041940
AI 84 DATA A959C5D0000A90005D0A4CDA92899
000560403A0DF010D09A260E05C8A926C5
SJ 85 DATA 05CC0A00A206200023E6D0A01304C0
20C324A5D00017A000207E23E6D0A00E04EF
KN 86 DATA C020C324A5D00005A9F4C227204C06
1A6ACDA0FF0CF805A92CC0A0F06F090005DA
JG 87 DATA D0F7EEF005000009000540A9449900
0509010540A005990105A93A99020501A
TZ 88 DATA E0E00E400390A2004196040106900

```

See
TYPE II
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```

40004403A9000690540004503A0004A9032057
MC 89 DATA D625C0A0F014CEFB05A900004203A2
002056E4A9D00A226200E1920041960A060A0
N0 90 DATA 900105609900005A92C990205ADF005
60904203C90300006909D40A31009A90009D22
EE 91 DATA 4903909D4003600DC505600DC40560
9D4503609D4403ADC40540ADC50540C560C
ZL 92 DATA E4A4CE20EF20A210A900009E1510A9
0165CE9D4403A90569009D40503A4C0097E00
PD 93 DATA 05C92F000EC6C0C6C0097F05C94ED0
03CE9E15A4CDA99099000520A415E000005A
V0 94 DATA 034C061E0003F006200A194C023A9
E0A226200E19200A194C061E05C806CC0A500
CT 95 DATA C0A6CC2000E19A0FF00C001C0F00E20
F0EECC99000E6C0D002E6CC0DEE2060A93F90
IF 96 DATA A272061264C061E2044FF
YJ 97 DATA ISK DRIVE 1ARE YDU SURE??IMSER
T DISK2:HIT ANY KEY (S=TD SCREEN)100
ZM 98 DATA DUT DF RAM! ALREADY EXIST510AD
L0AD FILE!70
RZ 99 DATA 1D1D10449C
ND 100 DATA ISKID 4.3 by Bernhard Dypenhei
MIANTIC 1/05!TYPE HELP for commands!CA
FA 101 DATA 007D4313
JF 102 DATA DMMANDS:!! DIR DIR Drive n!
etory! DIRn Dir. Drive n!
FORMAT Format disk! 62
EP 103 DATA MDS Write DD5.5V51.K->LI.-
>LISTD List to disk1.5->5. ->SAVE 5
ave to disk1.E->E. ->ENTER EF1
SF 104 DATA iter to men.1.->LD.->LDAD
Load data to men.1.R-> RUND Run disk
file!K-> LDEK Lock file!E0
M0 105 DATA U->UN.->UNLDEK Unlock file!N
->RE.->RENAME Rename file!D->DEL.->DEL
ETE Delete file!0->BL.->BL0AD Bif4
DD 106 DATA nary load!R->N. ->MOVE Mov
e file!!R9 runs up etc. To use DD5 ty
PE KILL.Reboot to restore DISKID.124
MH 107 DATA 00E2023D20D1047

```

INFO BITS

See Help.

LISTING 2

```

10 * LISTING 2
15 * INFOBITS.ASH
30 ICCDM = 50342
40 IC0AL = 50344
50 IC0AH = 50345
60 IC0LL = 50348
70 IC0LN = 50349
80 CIDV = 5E456
90 PUTREC = 909
100 GETREC = 905
110 RDICUR = 954
120 CN = 502FC

```

```

0130 EDL = 590
0140 ROLL = 90358
0150 S0UFL = 9E0
0160 S0UHF = 9E1
0170 S0LL = 5E2
0100 R = 5E3
0190 ROUF = 503FD
0200 M = 50600
0210 PLA
0220 PLA
0230 STA S0UHF

```

continued on next page

```

0240 PLA
0250 STA S0UFL
0260 PLA
0270 PLA
0280 STA S0LL
0290 ;
0300 GET LDX #510
0310 LDA #GETREC
0320 STA ICCDM,X
0330 LDA #R0UF#5FF
0340 STA IC0AL,X
0350 LDA #R0UF/256
0360 STA IC0AH,X
0361 LDA #131
0363 STA IC0LL,X
0365 LDA #0
0367 STA IC0LH,X
0370 JSR CIOU
0380 BNE END
0390 ;
0400 LDX #0
0420 LDY #0
0450 P1 LDA R0UF,X
0460 P2 CMP (S0UFL),Y
0470 BEQ P3
0480 CPY #0
0490 BEQ P4
0500 LDY #0
0505 LDX #0
0510 JMP P4
0520 P3 INY
0530 CPY S0LL
0540 BCS PRINT
0560 P4 INX
0570 CPX S0LL
0580 BCS GET
0585 CPY #0
0590 BNE P1
0595 STX R
0600 JMP P1
0610 ;
0620 END RTS
0630 ;

```

```

0000 PRINT LDX #520
0010 LDA #PUTREC
0020 STA ICCDM,X
0030 LDA #131
0040 STA IC0LL,X
0050 LDA #0
0060 STA IC0LH,X
0070 ;
0080 LDA RDI0UR
0090 CMP #20
0090 BCS PRDMP
0090 ;
0090 LDA #R0UF+50A#5FF
0090 STA IC0AL,X
0090 LDA #R0UF+50A/256
0090 STA IC0AH,X
0090 JSR CIOU
0090 JMP GET
0090 ;
1000 PRDMP LDA #MESSAGE#5FF
1010 STA IC0AL,X
1020 LDA #MESSAGE/256
1030 STA IC0AH,X
1040 JSR CIOU
1050 WAIT LDA C#
1060 CMP #255
1070 BEQ WAIT
1072 LDA #255
1074 STA C#
1080 LDA #CLEAR#5FF
1090 STA IC0AL,X
1100 LDA #CLEAR/256
1110 STA IC0AH,X
1120 LDA #5
1130 STA IC0LL,X
1140 LDA #0
1150 STA IC0LH,X
1160 JSR CIOU
1170 JMP PRINT
2000 ;
2010 MESSAGE .BYTE "*****",EOL
2015 CLEAR .BYTE "*****",EOL

```

TECH TIPS

This routine zeroes-out 256 bytes of RAM starting at decimal address ADDRESS:

```

0A 30 ZER=ADR("*****")
0A 40 REM X=USR(ZER,ADDRESS) Zeroes-out
256 bytes of RAM.

```

This routine performs a double PEEK at decimal address ADDRESS and ADDRESS+1. It's equivalent to: X=PEEK(ADDRESS)+PEEK(ADDRESS+1)*256

```

RA 50 DBPK=ADR("*****")
HT 60 REM X=USR(DBPK,ADDRESS). Does a double
PEEK at address and address+1.

```

Move NUM bytes from decimal address FROM to address TOO with this handy routine:

```

PY 70 SHIFT=ADR("*****")
CJ 80 REM X=USR(SHIFT,FRDM,TOO,NUM) Move
NUM bytes from memory location FRDM
to location TOO.

```

POKE 580,1 causes a coldstart when the [RESET] key is pressed. POKE 580,255 returns the [RESET] key to its normal state.

This is a timer routine that will make the computer wait JIFF jiffies:

```

PC 100 JIFF=ADR("*****")
IL 110 REM X=USR(JIFF,JIFFIES) Waits JIF
FIES

```

This statement quickly fills a string with blanks:

```

WP 120 DIM N5(100)
GK 130 N5(1)= " " ; N5(100)=N5(1)
V5 140 REM Quick1y fills a string with blanks.

```

NOTE: USR routines are REMmed to guide against potential lock-up. Remove REMs before RUNNING.

POKE 65,0 shuts off the beeping you hear during cassette and disk I/O. POKE 65,3 turns it back on again.

POKE 77,129 immediately starts the attract mode.

Send your output to the printer instead of the screen with POKE 838,166. POKE 839,238. Then POKE 838,163. POKE 839,246 sends your output back to the screen.

NEW BOOKS FOR ATARI

Roundup of the Latest Releases

by THE ANTIC STAFF

Mastering Your ATARI Through Eight BASIC Projects, edited by Tom Marshall, comes with a disk containing the 13 programs discussed in the book. These programs range from games and music generators to timers and micro-calculators. Every chapter uses one or two of these programs to demonstrate important programming concepts. Unfortunately in many instances, the editor refers to tables and illustrations which do not exist, and asks you to recall facts from chapters appearing much later in the book.

\$19.95. 174 pages. Prentice-Hall, Inc., 200 Old Tappan, Old Tappan, NJ 07675, (201) 767-5000.

Basic ATARI BASIC, by James S. Coan and Richard Kushner, takes you from an introduction to the PRINT statement to an analysis of Player-Missile Graphics. Beginning programmers should regard this book as a reference tool, rather than a tutorial. It is not easy reading, but the ideas and concepts presented are excellent. The "Bugs in Atari BASIC," section outlines many ways to overcome the language's limitations. Another section examines the special features of the XL Computers, such as enabling fine scrolling through a single POKE statement.

\$15.95. 324 pages. Hayden Book Company, 50 Essex Street, Rochelle Park, NJ 07662, (800) 631-0856.



Carl M. Evans's **ATARI BASIC—Faster and Better** shows you how to improve your BASIC programs with machine-language subroutines. The book contains listings and descriptions of more than 80 subroutines, including routines which can make your program unlistable, analyze your program's variables, generate AUTO-RUN.SYS files and create scrolling screen displays. You don't need to know any machine language to use this book; Evans has translated each assembly listing into DATA statements to use in your BASIC programs.

\$16.95. 300 pages. IJG, Inc. From Antic, 524 Second Street, San Francisco, CA 94107, (415) 957-0886.

Advanced Programming Techniques for your Atari Including Graphics & Voice Programs, by Linda M. Schreiber, will help you master scrolling, page-flipping, and several other important programming techniques. The book's most helpful chapter, "Working with the Display List," shows you how to create and manipulate customized graphics. The book is easy to read and contains more than 50 type-in programs, including a character set editor.

\$14.50. 207 pages. TAB Books Inc., Monterey Avenue, P.O. Box 40, Blue Ridge Summit, PA 17214, (717) 794-2191. continued on next page



101 Programming Surprises & Tricks for your ATARI Computer, by David L. Heiserman, should provide about 30 minutes of pointless entertainment and frustration for a bored eight-year-old. The book is a disappointing collection of 101 "mystery" programs. You type them in and see what they do. There are calendars, quizzes, mock weather predictions, games. Only some games are programmed to cheat, and there are other "practical joke" programs scattered throughout the book.

\$11.50. 196 pages. TAB Books Inc., Monterey Avenue, P.O. Box 40, Blue Ridge Summit, PA 17214, (717) 794-2191.



Robert A. Peck's *Advanced Atari BASIC Tutorial*, is a solid sequel to the *ATARI BASIC Tutorial*. It offers clear and comprehensive descriptions of advanced programming techniques such as string manipulation, disk operations and sorting techniques. Featured is a screen builder program to help you create and save your own graphics screens.

\$11.95. 174 pages. Howard W. Sams & Co., Inc., 300 West 62nd Street, P.O. Box 7092, Indianapolis, IN 46206, (317) 298-5400.

How to Get the Most Out of CompuServe, by Charles Bower and Davia Peyton. If you got a CompuServe Starter Kit as a present, or if you're just thinking about maybe becoming a subscriber to this tele-

communications information service, get this book. It presents a series of "guided tours" through CompuServe's many layers of menus and commands. The tutorial will save you from wasting considerable time and money as you get familiar with moving around CompuServe.

\$14.95. 275 pages. Bantam Books, 666 Fifth Avenue, New York, NY 10103, (212) 765-6500.

The Coming Computer Industry Shakeout: Winners, Losers & Survivors, by Stephen McClennan. The author is a leading computer stock analyst whose purpose here was to counsel on which high-tech companies to buy shares in and which to avoid. But the book also gives a startlingly frank, no-holds-barred critique of the good points and bad points of just about every important computer-related company. You'll get a kick out of this if you're interested in the computer industry as a whole.

\$19.95. 349 pages. Wiley & Sons, 605 Third Avenue, New York, NY 10158, (212) 850-6500.

BASIC on the Atari Computer for Kids, by Keith and Cherie Wyner, will give you a clear, simple and thorough introduction to BASIC programming. The text and examples are written at a fifth-grade level, but adults willing to study a "kiddie" textbook can expect to learn a good amount of BASIC in very little time.

\$12.95. 213 pages. Howard W. Sams & Co., Inc., 4300 West 62nd Street, P.O. Box 7092, Indianapolis, IN 46206, (317) 298-5400.

Getting Started with Your ATARI 600XL and The Atari 600XL Program Book, by Peter Goode, will help you get the most out of your XL. The Program Book is filled with well-documented type-in games, music programs, and Biohythm graphings. Just remember that these books were originally published in Great Britain, so the listings substitute the "Pound" sign for our number sign (#).

12.95 each. 150 pages. David & Charles, Inc., Box 57, North Pomfret, VT 05053, (802) 457-1911

Kids And The Atari by Edward Carlson is an excellent choice for adult beginners too, despite its title. Chock-full of brief BASIC samples and clever illustrations, the book is spiral bound for easier program typing. The writing is clear and conversational as it covers the fundamentals of BASIC.

\$19.95. 219 pages. Datamost, From Antic, 524 Second Street, San Francisco, CA 94107, (415) 957-0886.

The Musical Atari by Hal Glicksman simultaneously teaches you music and BASIC programming for the Atari's four voices. The book features 29 songs arranged for piano and Atari duets, plus a line-up of sound effects routines. Includes programs for turning the Atari keyboard into a piano or chord organ.

\$14.95. 167 pages. Datamost, From Antic, 524 Second Street, San Francisco, CA 94107, (415) 957-0886.



RESTON'S CREATIVE PASTIMES

The best way for most people to learn BASIC is by typing in short programs and experimenting with them. If the programs are accompanied by text that explains them and gives suggestions for alterations, so much the better.

Enter *Creative Pastimes*, a new series of \$6.95 spiral-bound books for beginners from Reston Publishing.

Homework Helper, at 149 pages the largest of the series, presents programs for memory skills, spelling and word problems, and history. The "Computer As A Tool" section gives

you programs for using your Atari as a calculator, to paint, plot bar graphs, sort lists, and to learn number systems.

The programs are presented in fully-explained modules, with instructions on how to combine modules for a larger, more powerful program. The book appears to be a translation for the Atari from a version written for some other computer. So it includes a few commands which simply don't work.

The Code Breakers (subtitled *An Atari Adventure*) contains a book-length narrative. Nikki and Adam are a teenage brother-and-sister detective team on the trail of a mystery. Using their computer, they decode clues with your help.

There are only seven short programs in the 75-page book, and none is well explained. However, as an interactive story-program for youngsters, "The Code Breakers" appears to have good entertainment value.

Once the first thrill of novelty has worn off, 41 **1/2 Fun Projects For Your Atari** promises to get you interested in playing with your computer again. There's a wide range of programs here, with a solid emphasis on puzzles. In addition, there are plenty of suggestions for modifying the programs to suit your requirements.

The first section, "Word Play," presents the familiar word-search puzzle, word and sentence-scrambling programs. "IQ Building" consists primarily of memory exercises, including a concentration-type game. "Strategy Puzzles" contains the star program of the book, an ancient Japanese game called Dozo with a skillful computer opponent. This game alone is probably worth the price.

The "Music and Noise" section takes advantage of Atari's flexible music-generation capabilities, including a program for tuning guitars and one for tutoring guitar. Finally, "Computer Utilities" provides programs such as "A Calculator Utility," "Decimal/Hex/Binary Conversion," and believe it or not, "A Computer Dating Service"! An appendix accounts for the title's "1/2," and gives

12 suggestions for modifying the book's programs or creating your own.

Atari Puzzlements is an interesting experiment. It seems to be intended more for the confirmed debugger than for those who are just learning about BASIC. The book is packed full with very short routines, each of which contains an error of some sort. A line may be scrambled or missing, or program lines may be in the wrong order, or there just might be a tiny mistake in one of the lines. The book's idea is to make you aware of the types of mistakes you make as a beginner, so you'll become more adept at tracking down and solving them. The quality is slightly marred by misleading instructions.

Creative Pastimes has a subcategory of books entitled "Itty Bitty Bytes". Intended for children from ages 6-9, the series attempts to capture children's interest with graphics and sound while teaching them about programming.

All books use the simple, straight-

forward approach of presenting a short program on one page, with a line-by-line explanation of the program (take-apart) on the facing page. In most cases, it will be necessary for parents to help their children type in and use the programs.

Itty Bitty Bytes of Space programs include "Gravity," "Music from Mother Earth," and "Meteors," a simple game. Some **School Days** programs include "Spelling Counts!," "State the States," and the intriguing "Gag Me With a Spoon," which lets you vent your frustration with the school cafeteria. **Matilda, the Computer Cat** contains "Fleas!," "Nine Lives," and "In the Kitty."

As inexpensive introductions to BASIC programming, the **Creative Pastimes** series succeeds. Most of the books provide good value and should keep young computerists occupied for hours with a minimum of frustration.

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OP CODE FINDER

Simplifying machine code analysis

by DONNY CHERF

Opcode Finder is a chart that conveniently brings together the symbols for all three formats of representing machine language subroutines in BASIC programs. This information makes it a lot simpler to hand-disassemble short subroutines for study or modification.

Once you understand the fundamentals of assembly language programming, a good way to improve your skills is by analyzing existing programs. You can find machine language subroutines in many of the BASIC programs published in *Antic*. To learn how the machine language is being used in the program, you can disassemble these subroutines (convert them back to assembly language).

This job becomes a little harder because there are three possible formats that can be used for representing machine language data in BASIC programs. These formats are:

Decimal Numbers

- numbers between 0 and 255 represent specific bytes of machine code.

Hexadecimal Numbers

- two characters stand for one byte of machine code.

ATASCII Characters

- the ATASCII numerical value of each character in a string represents a byte of machine code.

I put together the following chart so it would be easier for me to hand-disassemble short subroutines, or modify them slightly, without having to load an assembler into my Atari. The chart lists all opcodes (assembly language operating codes) in numerical order—alongside the corresponding hexadecimal values, ATASCII characters and assembly language formats (Aliforms).

Donny Churf is a computer science major from Merced, California. One of his earlier projects was an Atari version of the Yabtzee game.

continued on next page



assembly language

Decimal and Hex Codes for Instruction Set NUMERICAL

DEC	HX	CHAR	opc	Alform	DEC	HX	CHAR	opc	Alform	DEC	HX	CHAR	opc	Alform
0	00		BRK		89	59		EOR	aaaa,Y	174	AE		LDX	aaaa
1	01		ORA	(aa,X)	93	5D		EOR	aaaa,X	176	B0		BCS	aa
5	05		ORA	aa	94	5E		LSR	aaaa,X	177	B1		LDA	(aa),Y
6	06		ASL	aa	96	60		RTS		180	B4		LDY	aa,X
8	08		PHP		97	61		ADC	(aa,X)	181	B5		LDA	aa,X
9	09		ORA	"nn	101	65		ADC	aa	182	B6		LDX	aa,Y
10	0A		ASL	A	102	66		ROR	aa	184	B8		CLV	
13	0D		ORA	aaaa	104	68		PLA		185	B9		LDA	aaaa,Y
14	0E		ASL	aaaa	105	69		ADC	"nn	186	BA		TSX	
16	10		BPL	aa	106	6A		ROR	A	188	BC		LDY	aaaa,Y
17	11		ORA	(aa),Y	108	6C		JMP	(aaaa)	189	BD		LDA	aaaa,X
21	15		ORA	aa,X	109	6D		ADC	aaaa	190	BE		LDX	aaaa,Y
22	16		ASL	aa,Y	110	6E		ROR	aaaa	192	C0		CPY	"nn
24	18		CLC		112	70		BVS	aa	193	C1		CMP	(aa,X)
25	19		ORA	aaaa,Y	113	71		ADC	(aa),Y	196	C4		CPY	aa
29	1D		ORA	aaaa,X	117	75		ADC	aa,X	197	C5		CMP	aa
30	1E		ASL	aaaa,X	118	76		ROR	aa,X	198	C6		DEC	aa
32	20		JSR	aaaa	120	78		SEI		200	C8		INX	
33	21		AND	(aa,X)	121	79		ADC	aaaa,Y	201	C9		CMP	"nn
36	24		BIT	aa	125	7D		ADC	aaaa,X	202	CA		DEX	
37	25		AND	aa	126	7E		ROR	aaaa,X	204	CC		CPY	aaaa
38	26		ROL	aa	129	81		STA	(aa,X)	205	CD		CMP	aaaa
40	28		PLP		132	84		STY	aa	206	CE		DEC	aaaa
41	29		AND	"nn	133	85		STA	aa	208	D0		BNE	aa
42	2A		ROL	A	134	86		STX	aa	209	D1		CMP	(aa),Y
44	2C		BIT	aaaa	136	88		DEY		213	D5		CMP	aa,X
45	2D		AND	aaaa	138	8A		TXA		214	D6		DEC	aa,X
46	2E		ROL	aaaa	140	8C		STY	aaaa	216	D8		CLD	
48	30		BMI	aa	141	8D		STA	aaaa	217	D9		CMP	aaaa,Y
49	31		AND	(aa),Y	142	8E		STX	aaaa	221	DD		CMP	aaaa,X
53	35		AND	aa,X	144	90		BCC	aa	222	DE		DEC	aaaa,X
54	36		ROL	aa,X	145	91		STA	(aa),Y	224	E0		CPX	"nn
56	38		SEC		148	94		STY	aa,X	225	E1		SBC	(aa,X)
57	39		AND	aaaa,Y	149	95		STA	aa,X	228	E4		CPX	aa
61	3D		AND	aaaa,X	150	96		STX	aa,Y	229	E5		SBC	aa
62	3E		ROL	aaaa,X	152	98		TYA		230	E6		INC	aa
64	40		RTI		153	99		STA	aaaa,Y	232	E8		INX	
65	41		EOR	(aa,X)	154	9A		TXS		233	E9		SBC	"nn
69	45		EOR	aa	157	9D		STA	aaaa,X	234	EA		NOP	
70	46		LSR	aa	160	A0		LDY	"nn	236	EC		CPX	aaaa
72	48		PHA		161	A1		LDA	(aa,X)	237	ED		SBC	aaaa
73	49		EOR	"nn	162	A2		LDX	"nn	238	EE		INC	aaaa
74	4A		LSR	A	164	A4		LDY	aa	240	F0		BEQ	aa
76	4C		JMP	aaaa	165	A5		LDA	aa	241	F1		SBC	(aa),Y
77	4D		EOR	aaaa	166	A6		LDX	aa	245	F5		SBC	aa,X
78	4E		LSR	aaaa	168	A8		TAY		246	F6		INC	aa,X
80	50		BYC	aa	169	A9		LDA	"nn	248	F8		SED	
81	51		EOR	(aa),Y	170	AA		TAX		249	F9		SBC	aaaa,Y
85	55		EOR	aa,X	172	AC		LDY	aaaa	253	FD		SBC	aaaa,X
86	56		LSR	aa,X	173	AD		LDA	aaaa	254	FE		INC	aaaa,X
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THE PARALLEL BUS REVEALED continued from page 47

serious about writing professional-level software or designing any kind of hardware for the Atari computer, this manual is a must. As we go along, I'll briefly explain the concepts you need for these articles, but these explanations are not offered as a substitute for the Tech Reference Notes.

SUMMING UP

So far we've learned: The OS contains a Generic Handler for parallel devices. It selects one of up to eight devices

through a hardware register and keeps track of it through a shadow register. The parallel device has a ROM containing low-level driver vectors (and, perhaps, the drivers themselves) and an INIT routine. During coldstart, the OS will run the INIT routine and the device will declare its existence by writing its bit into the Device Mask and putting its name, along with the Generic Handler's address into HXAB5. In operation, the device and the OS communicate through the 6502's A, X, and Y registers plus the Page Zero IOCB. The parallel device cannot use OS Floating Point routines

because the device's ROM is mapped into those same locations.

Not too hard, huh? Next month we'll look at hardware requirements, and after that, we'll work up an example and look at interrupts. In the meantime, try to resist the urge to tear off that little cover. We'll explain how to do it safely in the next Antic.

Earl Rice held a number of high-level technical positions at Atari, including head of users group support. His last post there was project leader of the projected top-of-the-line 1450XL computer.



NEW ATARI FLI

Latest Simulation Software

by CHARLES JACKSON
Antic Staff Writer

Professional pilots as well as armchair astronauts and arcade aces will enjoy these "uplifting" new programs for the Atari. **Flight Simulator II** and **Space Shuttle** plus **F-15 Strike Eagle** all offer more realism than many "professional" flight simulators.

SPACE SHUTTLE

Space Shuttle is a home version of the flight simulator used to train shuttle astronauts. You begin your mission in the cockpit 15 seconds before liftoff. Fire your main engines and watch a blue sky fade to black as you pilot the shuttle into orbit 210 miles above the earth. There, you must rendezvous with a satellite and return to earth before running out of fuel.

Your shuttle is equipped with five radar screens, two sets of retro rockets and a mission status board. Use the board to monitor elapsed time, position, speed, fuel level, plus status of

your engines, landing gear and payload bay doors.

Programmers Steve Kitchen and Bob Henderson included many special effects. Just after liftoff, you'll see a flash of light and hear your booster rockets fall away from you. During re-entry, while plummeting through the electrically-charged upper atmosphere, some of your instruments will temporarily "black out," just as they do during actual shuttle flights. As you near the runway, you'll hear a pair of sonic booms as you pass through the sound barrier. Upon landing, your main tires squeal as the shuttle rolls to a halt at the end of the runway.

Space Shuttle offers three training modes: an introductory level to give you the "feel" of flying the shuttle, a "training" level to sharpen your piloting skills, and the "Mission" level where you must test your skill against the clock and a diminishing fuel sup-

ply. I'd recommend this simulation game for ages 10 and up.

FLIGHT SIMULATOR II

Flight Simulator II is the most advanced flight simulator program available for the Atari. It puts you in the pilot's seat of a true-to-life light airplane, a Piper Cherokee Archer. The program features four-color scenery including mountains, islands, buildings, parks and 80 usable airports. At the start, you're on a runway at Meigs Field near Chicago, facing the Sears building and John Hancock tower. The program also comes with recognizable scenery for Chicago, New York, Seattle and Los Angeles.

Flight Simulator II has an editor that can freeze your position and change any combination of flight conditions, such as altitude, speed, location,



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SubLogic Corporation
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Champaign, IL 61820
(217) 359-8482
\$49.95 38K—disk

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A Journey Into Space
Activision, Inc.
2350 Bayshore Frontage Road
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power setting, weather conditions and time of day.

Beginners should be warned that Flight Simulator II is a sophisticated program with very detailed instructions. If you've never piloted an airplane before, your first few days with this software will be filled with stalls and crashes.

Flight Simulator II is not easy to fly. The plane is controlled by joystick plus much of the keyboard. You must press the right cursor arrow key 16 times to advance from idle to full

throttle. Press the [5] and [B] keys to look out of the rear window, and repeatedly press the [C] or [M] key to move the rudder.

The program comes with a 92-page book about aeronautics, a 90-page flight manual and pilot's handbook, four flight charts and a double-sided "quick reference" card. Flight Simulator II is not really a game, although it offers a "game" option. The program is actually an excellent training tool which can best be used by student pilots or aviation buffs aged 16 and up.

F-15 STRIKE EAGLE

Launch into the most exciting aerial combat since *Star Raiders* with F-15 Strike Eagle. Microprose Software has realistically computerized seven sky battlezones over the Mid-East and Viet Nam.

As the pilot of a fully equipped F-15 jet fighter, your first mission sends you into Libya to bomb military airfields and the Libyan Air Command Center. A Libyan Su-22 fires a heatseeking missile toward you as the dogfight begins. Should you need to refuel, you can land on the carrier Nimitz, now patrolling the Mediterranean just off the coast of Libya.

The U.S. Air Force F-15 offers state-of-the-art navigation and weapons systems, including computerized radar and tracking displays, radar jammers, electronic early-warning systems, automatic steering cues, eight supersonic guided missiles, 18 bombs and a 20mm cannon with 1,000 rounds of ammunition.

Your flight instruments, navigation cues and warning signals are projected onto the front windshield. These "heads-up" displays let pilots monitor their instruments while closing on a target. The game is the first flight simulator to include such a display.

The game is controlled by keyboard and joystick. A second joystick may be added to control your throttle and speedbrakes.

F-15 Strike Eagle is an engrossing game which challenges pilots of all skill levels. Beginners will enjoy flying the F-15. Jet aces will enjoy mastering it. **A**

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ROME AND THE BARBARIANS NAPOLEON AT WATERLOO

KRENick Software

P.O. Box 3372

Kansas City, KS 66103

(913) 362-9267

\$34.95 each, 32K—disk or cassette

Reviewed by Michael Ciruolo

In 476 A.D., the Roman Empire collapsed. Historians argue about the causes—internal bureaucratic problems, poor assimilation of conquered people, failure to withstand the barbarian hordes, etc. Now a game combines these factors with the number-crunching ability of the microcomputer and the Atari's graphics.

Rome and the Barbarians looks like a standard military simulation/strategy board game with smooth scrolling and joystick control of the cursor. However, it is not that simple.

The screen shows the location of Roman units, rebel Romans, invading barbarians, allied barbarians, mercenaries and locals. This game's excellence comes from its realistic understanding of historical issues. The instruction manual warns that "Although *Rome and the Barbarians* is a military simulation, the strategy must be based on economics."

The economics involved are complex, but not overwhelming. You must consider city tax values, troop payment, your treasury, hiring barbarians, collecting taxes, barbarian tribe loyalty and so on.

Use the joystick to move the large, square cursor over a map of Europe. The map's graphics have nice touches, such as the snow-capped mountains turning brown in the summer. The joystick button determines troop movement. The [SELECT] and [OPTION] keys, pressed when the cursor is over one of the factions,



ROME AND THE BARBARIANS



NAPOLEON AT WATERLOO

cause the computer to display tax values, troop data and treasury information.

Documentation is excellent. It includes tips, insight into the game from designer Steve Krenek, historical observations, a map, and tax charts.

The amount of information that must be absorbed to play the game successfully is significant. This adds staying power to the game, but makes it difficult to simply boot up and play. The example and beginner games help.

Combat is attended by the sound of clanking swords. Because of the general lack of sound, this is abrupt and surprising.

Napoleon at Waterloo is a more basic version of *Rome and the Barbarians*. It is concerned with the military strategy involved in deploying forces and fighting. You play against the computer, using the same joystick and smooth scrolling from Krenek's other game. Simpler, shorter, and easier to play, *Napoleon* resembles the study an artist produces prior to painting a masterpiece. It's a good warm-up to *Rome*.

EPIDEMIC

Strategic Simulations, Inc.

883 Sierlin Road, Building A-200

Mountain View, CA 94043

(800) 227-1617, ext. 335 outside CA

(800) 772-3545, ext. 335 in CA

\$34.95, 48K—disk

Reviewed by Jordan Powell

Are you up for saving the world from a deadly infection from outer space? **Epidemic**, a new simulation game from SSI, allows you just this opportunity.

Meteorites bearing killer alien microbes are headed towards Earth. Your primary defensive weapons are missiles with nuclear warheads for destroying meteorites still in space. You can't hit all of them, though. And once a meteorite hits, the microbes multiply and spread, starting an epidemic. You combat this epidemic with an array of biological and other weapons. As a last resort, you can detonate nuclear devices to destroy entire areas, stopping the disease at the cost of millions of human lives. The goal is to neutralize the disease and stop the spread of epidemics with the least amount of casualties.

As in any good strategy game, you must juggle many variables and inter-related factors. Since you can only accomplish a certain amount in 24 hours, you must allocate your resources wisely. Should you attempt to destroy a meteorite, and if so, which one? Which area of the planet should receive which remedy? You must also deal with uncontrollable meteor impacts and the spread of a disease across geographical boundaries.

A wealth of information is displayed in various forms each turn, but you must know how to interpret it to make the right decisions. Some of the displays take a long time to develop, but they enhance the game by taking advantage of Atari's graphics. For instance, a map of the globe depicts all

continues on next page

product reviews

areas' current status with various colors and textures. The documentation is a little weak in its description of the displayed data, so you may have to read it a few times and play two or three practice games to understand everything.

A full game can take as long as an hour, but unfortunately, there's no way to save a game in progress. I found Epidemic frustrating to play initially, but as my ability increased the game became much more interesting. If you like games that require thought and the juggling of multiple factors to solve a problem, you'll enjoy Epidemic.

STAR WARS

Parker Bros.
50 Durham Road
Beverly, MA 01915
(617) 927-7600
\$44, 12K-cartridge

Reviewed by George Adamson

Star Wars: The Arcade Game (Parker Brothers) brings little to the Atari world beyond the appeal of the title. In this adaptation of the movie plot you fly a fighter, firing at other fighters before attempting to destroy the Death Star.

Moving the joystick moves a gun-sight; stationary cannons in each corner of the screen fire toward the sight. The poor 3-D effect would have been better if the cannons moved with the sight instead of remaining still.

The appearance of the Death Star is disappointing. It doesn't enlarge to give the illusion of approach. Instead, the screen switches without warning to converging lines representing the trench on the Death Star. There is little impression of movement through the trench.

Star Wars features a standard status line with points, level and remaining shields at the top of the screen. Despite bearing the name of a besell-

ing movie, this game quickly becomes monotonous and adds nothing to the state-of-the-art.

BRUCE LEE

Datasoft
19808 Nordhoff Place
Chatsworth, CA 91311
(213) 701-5161
\$34.95, 32K—disk and cassette

Reviewed by Harris Shiffman

Somewhere beneath Earth's surface lies the vast domain of an evil wizard. Within this realm lie treasures beyond imagining, protected by perils too great to number. The wizard has guarded his underground fortress well, and it will take all the skill and cunning of the greatest of all martial artists to prevail.

Welcome to the world of **Bruce Lee**, Datasoft's latest entry into the arcade adventure genre. As Lee, you explore the wizard's underground lair in hopes of finding his treasure. Passage from one chamber to the next is achieved by touching the right combination of lanterns that appear throughout the maze. Your only defenses against the dangers of the caverns are your hands, your feet, and years of athletic training.

There are numerous traps located throughout the many chambers. You'll also need to deal with the wizard's private army, a series of black-robed Ninja warriors and a large green fighter called Green Yamo. Although a few well-placed kicks dispatch these fellows, they're soon replaced. Fortunately, you are a good deal harder to kill than they are.

As an arcade-type adventure game, Bruce Lee represents a middle ground. It isn't as demanding of reflexes and endurance as Shamus and Shamus II, but is more difficult than the elementary *Pharaoh's Curse* (all from Synapse). The background graphics and animation, while not particularly

original or innovative, are clean and attractive, and player response to joystick movement is very good.

There's one relatively minor flaw. Upon loading the game, a 40-second-long introduction displays Bruce Lee's likeness accompanied by pleasant mood music. It's impossible to cut this short and get on with the game.

Bruce Lee is interesting, challenging, and fun to play. While it could stand an injection of excitement, it is a worthy addition to the adventure maze gamer's collection.

QUEST OF THE SPACE BEAGLE

Avalon Hill Game Company
4517 Harford Road
Baltimore, MD 21214
(301) 254-9200
\$35, 48K-disk-requires BASIC

Reviewed by Michael Cirio



Like its predecessor, *Jupiter Mission 1999*, *The Quest of the Space Beagle* combines a variety of arcade games under a uniting theme—your quest to survive, locate the earth and return home.

There are three parts. In the first, your ineffectual robot fighters battle a space armada as you attempt to capture a planet. Then you try to survive in a maze as your air and water repeatedly dwindle. Finally, your patience and memory skills are tested as you search for Earth among all the stars in the known universe. You can't get from one level to another without

product reviews

completing the first level, although you can save games.

The graphics are fine, but are accompanied by a powerful 60-cycle flickering which is initially distracting and later headache producing.

The second major flaw: there is little incentive to get to the next level, so the game gets boring quickly. You do the same thing again and again. The only reward comes at the end of the game, when you find your way back to Earth. You'll need the attention span of Yoda to succeed.

REALM OF IMPOSSIBILITY

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
\$35, 48K-disk

Reviewed by Jack Powell



A few years ago, a guy named Mike Edwards started to write a football game. Somewhere along the line, the defensive team turned into zombies, spiders and snakes. The playfield twisted and mutated, and the whole thing became a nightmare. Mike called the game "Zombies" and a small software company named BRAM, Inc. put it on the market.

The original Zombies had seven dungeons and a total of 74 rooms, with some of the most stylish graphics seen on the Atari. Along came Electronic Arts, the software marketing marvels. They liked Zom-

bies a lot. So, they went to tiny BRAM, Inc. and **Realm of Impossibility** was born.

Realm of Impossibility is Zombies, but changes have been made. Some good. Some bad. The best part of Zombies had always been the incredible dungeon called "The Realm of Impossibility", which was fashioned after the intricate optical illusions of illustrator M.C. Escher. Electronic Arts sent Mike Edwards back to his computer to design more of these goodies. The result is six new dungeons and 55 additional rooms for a grand total of 129 rooms filled with snakes, spiders and zombies—plus some unusual beasts called "orbs", which bear a striking resemblance to Oreo cookies.

Some things haven't changed. You're still a tiny, frantic creature, jerking and waving in animated panic. The game has what is referred to as a "two player cooperative mode". This means that two of you can explore these mazes, but you must cooperate and help each other because both of you must leave each room together. If your partner dies, you can resurrect him.

In the old game, you searched each dungeon for one of the seven stolen crowns. In Realm of Impossibility, some of the rooms are locked and can't be entered until you find the keys hidden in the other rooms. This adds somewhat to the texture of the game play. There are also four levels of difficulty which I found to be a vast improvement over the original, which was so hard that I yanked the disk out of the drive and gave up in frustration.

Unlike most computer games, you have no weapons here. You can't kill anyone. Instead, you drop little crosses behind you which temporarily block the pursuers. You also collect spells which, when cast, confuse or freeze all opponents for a brief period. The method of casting a spell, however, is ridiculously awkward.

First, you've got to stop moving the joystick. When you've got every monster in the world racing after you, the last thing you want to do is stop. Fortunately, you can simply hit the space bar to cast a spell.

After a while it all becomes the same. It's still too frantic and speedy and little strategy or skill is required. The rooms are marvelous and inventive but they're really nothing more than decorative pathways filled with the same tiny relentless creatures.

RAILS WEST

Strategic Simulations, Inc.
883 Stierling Road, Building A-200
Mountain View, CA 94043
(415) 964-1353
\$39.95, 48K-disk

Reviewed by Christine Lamardini

From unexplored, unsettled wilderness to thriving, industrialized civilization in 60 years, this country changed as railroads laced the continent during the 19th century. It was a time of phenomenal growth where personal fortunes were made and lost as entrepreneurs competed to build industrial empires.

Rails West, (SSI), is one of the best economic simulations ever presented. Written by historian Martin Campion, Rails West reflects a substantial knowledge of 19th century railroad building. The game allows one to either players to compete against each other or the computer to build a transcontinental railroad connecting midwest terminals to the west coast. You also compete to build the largest personal fortune.

Rails West is not for the faint of heart. It requires an understanding of free market economics and will challenge your skill as an entrepreneur. To succeed, you must figure out the relationship between issuing stock on the open market, floating bonds, and servicing your debts—while managing to

continued on next page

product reviews

keep enough of your corporation's stocks to prevent interlopers from gaining control of your road.

You can start the game in 1870, when there was only the skeleton of a rail network, or in 1890 when the roads were in place but ripe for takeover. The novice should gain experience playing the 1870 version first.

Rails West is both an educational simulation and a game of skill. Economic conditions fluctuate from year to year, and there is risk as you move from boom times through fair times to depression. The skill is in knowing when you can safely carry a large debt to capitalize your fledgling road, and when to play your cards closer to the vest with the intention of capitalizing on someone else's misfortune. You need not know about railroads or history to play Rails West, but there is a bonus for those who know something of the times.

Rails West is well worth the effort it takes to learn the rudiments of play. It will make an excellent classroom aid, particularly for group participation, and it is a challenging excursion into the land of robber barons for the individual player.

ADVENTURES WITH THE ATARI

by Jack Hardy

Reston Publishing
11480 Sunset Hills Rd.
Reston, VA 22090
(800) 336-0338
\$14.95

Reviewed by Jerry White

If you'd like to start creating your own adventure games, **Adventures With the Atari** is all you need.

This 356-page book includes type-in listings of six different adventure game programs. One text adventure and one graphic adventure are supplied in Atari BASIC, in Microsoft BASIC and in Atari PILOT. These well-

written programs are clearly printed for easy reading.

You also get two Atari BASIC programs—The Creator and The Interpreter—that let you design and write your own text adventures by simply filling in data. You can use the program shell to create as many different adventures as you like; as long as each game is stored on a separate disk.

The book also includes adventure maps and flowcharts, as well as a variety of useful programming information. And if you'd rather avoid hours of typing, the author will provide readers with the programs on disk for \$12.

My congratulations to Jack Hardy and Reston Publishing on a job well done.

X-BASIC & SCROLL-IT

SUPERware
2028 Kinghouse Road
Silver Springs, MD 20904
(301) 236-4459
\$29.95, disk or cassette
requires BASIC

*Reviewed by
Lawrence Dziegielewski*

There appears to be no end of strong new utilities for your Atari. SUPERware has taken some of the trouble out of BASIC programming with two utilities from programmer George Schwenk, **X-BASIC** and **SCROLL-IT**.

X-BASIC extends Atari BASIC by adding several powerful features at an extremely affordable price. The utility adds 30 functions, including string arrays, simplified Player/Missile graphics and sound and memory functions.

X-BASIC is loaded into about 2K of RAM. It is called into action from BASIC through the USR function. Each function is a separate, "pre-programmed" machine language subroutine which the user simply inserts into his own BASIC code. You just use

the X-BASIC mnemonic (such as DPEEK for a two-byte PEEK), which is easier to use than the standard convention of doing your own machine language subroutines. Sample programs are included on the disk which demonstrate the power of the utility.

The utility's one major drawback is that extensions must be loaded in every time you want to execute an X-BASIC coded program. One way to avoid this is to save the X-BASIC source with the BASIC source into one load file. But still, this is not as easy nor as convenient as a cartridge.

Schwenk's other utility is **SCROLL-IT**, a machine language program that allows the user to produce intricate fine screen scrolling without the hassle of extensive programming. A sample program is included with the program to demonstrate the utility's power.

SCROLL-IT is called from your BASIC program. It uses BASIC line

**Sample programs
demonstrate
the power of the utility.**

numbers 29000 to 29199, and is initialized with a USR call from within the program. Before calling in **SCROLL-IT**, the programmer must define certain variables in the USR call. Once defined, the USR call installs **SCROLL-IT** and executes it as a Vertical Blank Interrupt. If you have other routines that also execute during VBI, they must be defined and initialized before **SCROLL-IT** in order for the utility to work properly. Once the utility is in place, you need only POKE the various Page 6 locations to use **SCROLL-IT**'s functions.

Both of these come with adequate documentation, but there is room for improvement. They are not as easy to

product reviews

use as a cartridge-based language, and assume too much skill of a beginning programmer. Once mastered, however, they make powerful tools.

MONTANA READING PROGRAM

PD1

95 East Putnam Avenue
Greenwich, CT 06830.

(203) 661-8799

\$24.95, 32K-disk

\$19.95, 32K-cassette

Reviewed by Rhonda Holmes

The Montana Reading Program helps improve a child's reading skills. Designed for children from five through eight, the program teaches 220 commonly used words that make up the Dolch list. Successful learning of these words is widely believed to strengthen reading ability.

The concept of moving
up in levels
helped motivate the kids.

Target words are displayed in simple sentences. After a sentence is displayed, the target word flashes for a short time and is then erased. A box is set in place of the word, outlining the word's basic shape and length. The child is asked to type in the missing word. If the first try is correct, 150 points are tallied on the pinball-style scoreboard. If the child makes a mistake, the computer gives the message to try again. If the child doesn't get it by the third try, the computer proceeds to the next sentence.

Twelve children, between four and eight, who helped me review this program found its graphics and sound captivating. The concept of moving

up in levels through continued play helped motivate the kids. Beyond its benefit to reading skills, this program also builds computer and typing skills ... all increasingly important today.

ASSEMBLY LANGUAGE PROGRAMMING FOR ATARI

by Mark Chasin
McGraw-Hill Inc.

1221 Ave. of the Americas
New York, NY 10020

(212) 997-1221

\$15.95

Reviewed by Jerry White

Learning assembly language isn't supposed to be easy, but it just got easier to understand with **Assembly Language Programming for the Atari Computer**.

This readable 304-page book takes you from the fundamentals of AL programming to complex examples that fully utilize the Atari's unique architecture. It is the book to read if you want to learn AL or simply AL subroutines.

You'll learn about Atari hardware, assembler software and legally accessing Atari operating system routines. Routines included teach the use of interrupts, I/O, sound and graphics; the source code for these routines is available on disk for \$12.95.

CHAOS

Touch Stone Software

3213 South 214th East Avenue

Broken Arrow, OK 74014

(918) 258-0222

\$29.95, 48K-disk

Reviewed by Christopher Chabris

CHAOS, the Character Animation Operating System, produces complex animation by combining the concepts of character and Player/Missile graphics.

Like P/M graphics, CHAOS has

movable objects and collision registers. However, it also has eight shapes, each composed of four colors and eight-by-eight pixel resolution. Because you're able to use P/M and CHAOS together, you can have up to 16 moving objects on the screen simultaneously.

CHAOS is accomplished through BASIC's PEEK and POKE function. Objects can be moved automatically in four directions at two speeds. The system places an object's coordinates and collision information in registers that your program can read, so your program can activate the motion with a few POKES and then rest while CHAOS executes the motion every VBI. This is an excellent feature because it frees your program for other processing.

CHAOS consumes nearly 6K of RAM. If you use DOS 2.0, CHAOS, P/M graphics and Atari BASIC, you could have only 23K RAM free. However, CHAOS uses none of the Page 6 memory and is compatible with BASIC XL. **A**

New Atari Customer Service Phone (408) 745-4851

As Antic went to press, we discovered that the Atari Corp. once again has a Customer Service phone number. It's (408) 745-4851—no more toll-free 800 service. And unfortunately the line seems to be busy most of the time.

For the Atari Corp's current service policy, see the previous issue of Antic (December 1984, page 6).

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
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F-15 STRIKE EAGLE (simulator) has all the features that makes the real EAGLE the great fighter aircraft it is — afterburners, multiple radars, air to air missiles, high explosive bombs, cannon, drop tanks, Electronic Counter Measures (ECM) flares, electronic ground tracking maps, Heads Up Display (HUD), outstanding 3-dimensional cockpit visibility, and realistic F-15 maneuverability. Your mission is to take off from your base, fly to and destroy your primary target through all the dangers of enemy territory including Surface to Air Missiles and enemy aircraft. Of course, you have to get back home again, too!!

F-15 STRIKE EAGLE is a very real simulation, accom-

plished with the guidance of real fighter pilots, and includes seven different combat missions, four skill levels, and an infinite number of exciting scenarios. F-15 will thrill and challenge you and give you the chance to prove you have the "Right Stuff" of an EAGLE fighter pilot!!

F-15 STRIKE EAGLE is available for Commodore 64, ATARI (48K), and Apple II (54K) computers. Suggested retail price is only \$34.95. Find STRIKE EAGLE at your local retailer, or call or write for MC/VISA, or COD orders. Add \$2.50 for Postage and Handling (Int'l add \$4.00USD). MD residents add 5% sales tax.

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